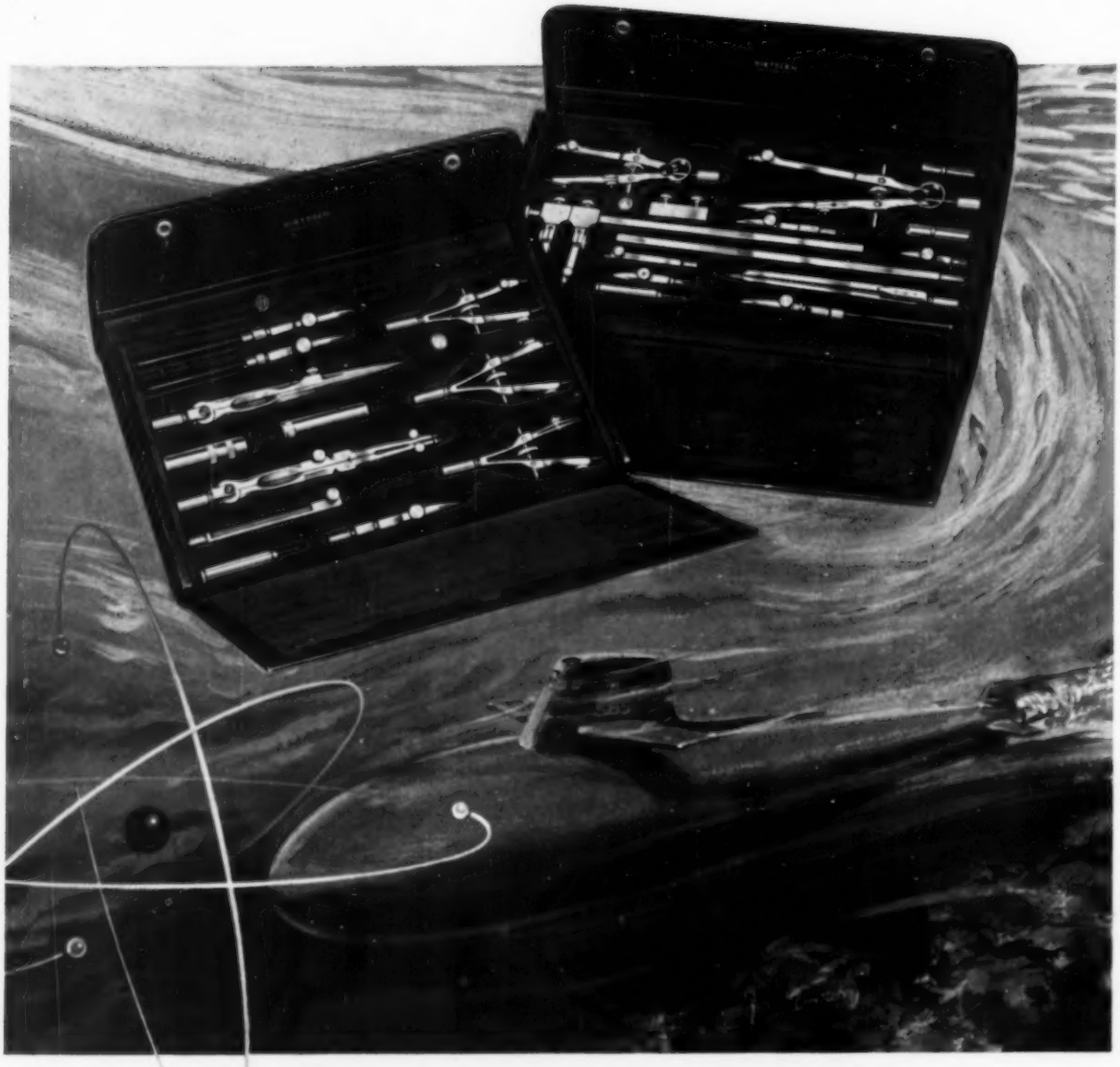
September, 1958 Vol. 47 No. 7

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

SCHOOL OPENING NUMBER



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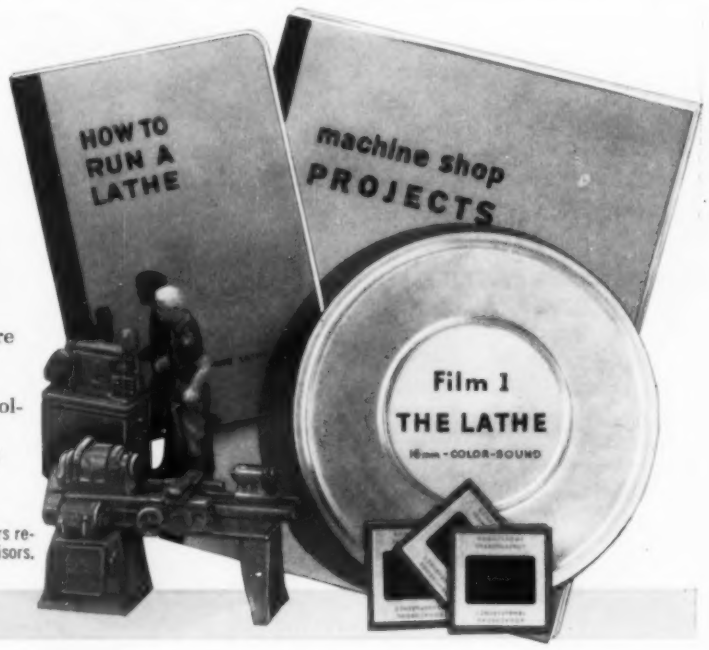

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SEPTEMBER
1958

VOL. 47 NO. 7

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway, Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 233 Broadway, New York 7, N. Y.

★ ★ ★

This Month's Cover

This month's cover picture shows three girls at work in the woodshop course at Lincoln Junior High School, Santa Monica Unified School District, Santa Monica, Calif.

A story concerning this new program appears on page 204 of this issue. Refer to William G. Poole's "Coeducation Wood Shop."

Your Change of Address

May we remind you again? If you have not already done so, kindly notify the circulation department of The Bruce Publishing Company of your new address for the school year 1958–1959.

★ ★ ★

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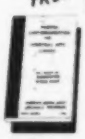

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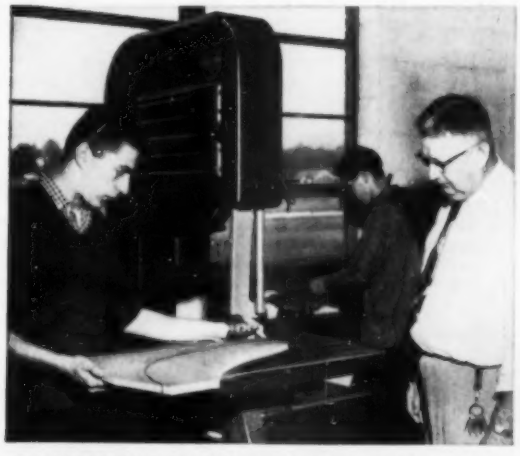

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Association News

COMING CONVENTIONS

Oct. 10–11. Four State Industrial Arts Conference, at Kansas State Teachers College, Pittsburg, Kans. Secretary, Forest L. Penny, Kansas State Teachers College, Pittsburg, Kans.

Oct. 16–18. Maryland Vocational Association, at 5th Reg. Armory, Baltimore, Md. Secretary, Austin E. Gisriel, Kenwood Senior High School, Baltimore 21, Md.

Oct. 23–24. Minnesota Vocational Agriculture Instructors Association, at Leamington Hotel, Minneapolis, Minn. Secretary, Dennis Lehto, Evansville, Minn.

Nov. 1. North Carolina Industrial Arts Association, at Goldsboro, N. C. Secretary, Tom Haigwood, Eastern Carolina College, Greenville, N. C.

Nov. 5–7. Missouri Vocational Association, at Municipal Auditorium, Kansas City, Mo. Secretary, H. H. London, University of Missouri, 202 Industrial Arts Bldg., Columbia, Mo.

Nov. 6–7. Iowa Industrial Education Association, at Hotel Savery, Des Moines, Iowa. Secretary, Leonard Bengtson, Junior High School, Ames, Iowa.

Nov. 7–8. Kentucky Industrial Education Association, at Kentucky Hotel, Louisville, Ky. Secretary, Alfred H. Meyer, 546 South First St., Louisville 2, Ky.

Nov. 13–15. Mississippi Valley Industrial Arts Conference, at LaSalle Hotel, Chicago, Ill. Chairman, Dr. Verne C. Fryklund, Stout State College, Menomonie, Wis.

Nov. 14–15. New England Industrial Arts Teachers Association, at Eastland Hotel, Portland, Me. Secretary, Edward P. Stach, 1734 Central Ave., Bridgeport 10, Conn.

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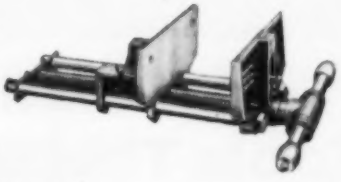
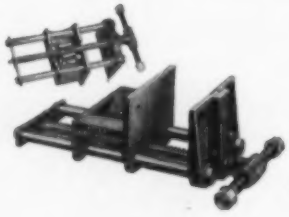


18A dual purpose vise



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CONFERENCE ON PRINTING EDUCATION

The International Graphic Arts Education Association held the 33rd Annual Conference on Printing Education on August 3 to 8, 1958, at Stout State College, Menomonie, Wis.

The theme of the conference was "New Trends in the Graphic Arts Industry and Education."

The conference program chairman was Lloyd Whydotski, Stout State College.

The program opened on Sunday afternoon with registration, an executive committee meeting, dinner, and a worship and memorial service, followed by the president's reception at 9:00 p.m. at Bertha Tainter Hall, Lounge.

The opening session of the conference was at 9:00 a.m., Monday. A welcome address was given by John A. Jarvis, dean, School of Industrial Education, and director of the summer session at Stout.

Some of the topics discussed during the five-day conference were: "Copy Preparation for Offset Lithography," "The Reproduction Camera," "Stripping and Lithographic Plate Making," "Lithographic Press Operation," and "Gimmicks for Better Teaching."

Special addresses delivered by guests covered "New Trends in Offset Lithography," "New Trends in Industrial Arts Education," "New Trends in Letterpress," "New Trends in Gravure," "Changing Concepts in Trade and Industrial Education," and "New Look in Our New Employees."

A special Ladies' Program was planned under the chairmanship of Mrs. Fred M. Mason, Madison, Wis.

The Conference Banquet was held on Thursday at 6:00 p.m., at Bertha Tainter Hall Dining Room, and the business meeting was conducted on Friday morning at 10:30, under the chairmanship of Howard Massman, Dayton, Ohio, president of the association.

SIXTH ANNUAL STATE CONVENTION

The sixth annual convention of the Colorado Industrial Arts Association was held in the Denver area on April 11 and 12, 1958.

During registration on Saturday, twenty firms exhibited and demonstrated their equipment and supplies.

Following the registration, the group assembled in the Hodgkins cafeteria for the business meeting. Just before the meeting was called to order, U. L. Hiatt, of La Junta, presented O. M. Friesen, the retiring president, with a gavel and case made by Mr. Hiatt.

The business meeting included reports by the various area chairmen.

Afternoon workshops in five major areas were held. They included wood finishing, graphic arts, metalwork, drafting, and crafts.

A. N. Shaw of Grand Junction was elected president. Other officers are vice-president, William R. Erwin, Jr., Greeley, Colo.; secretary-treasurer, Jess Schmitt, Westminster;

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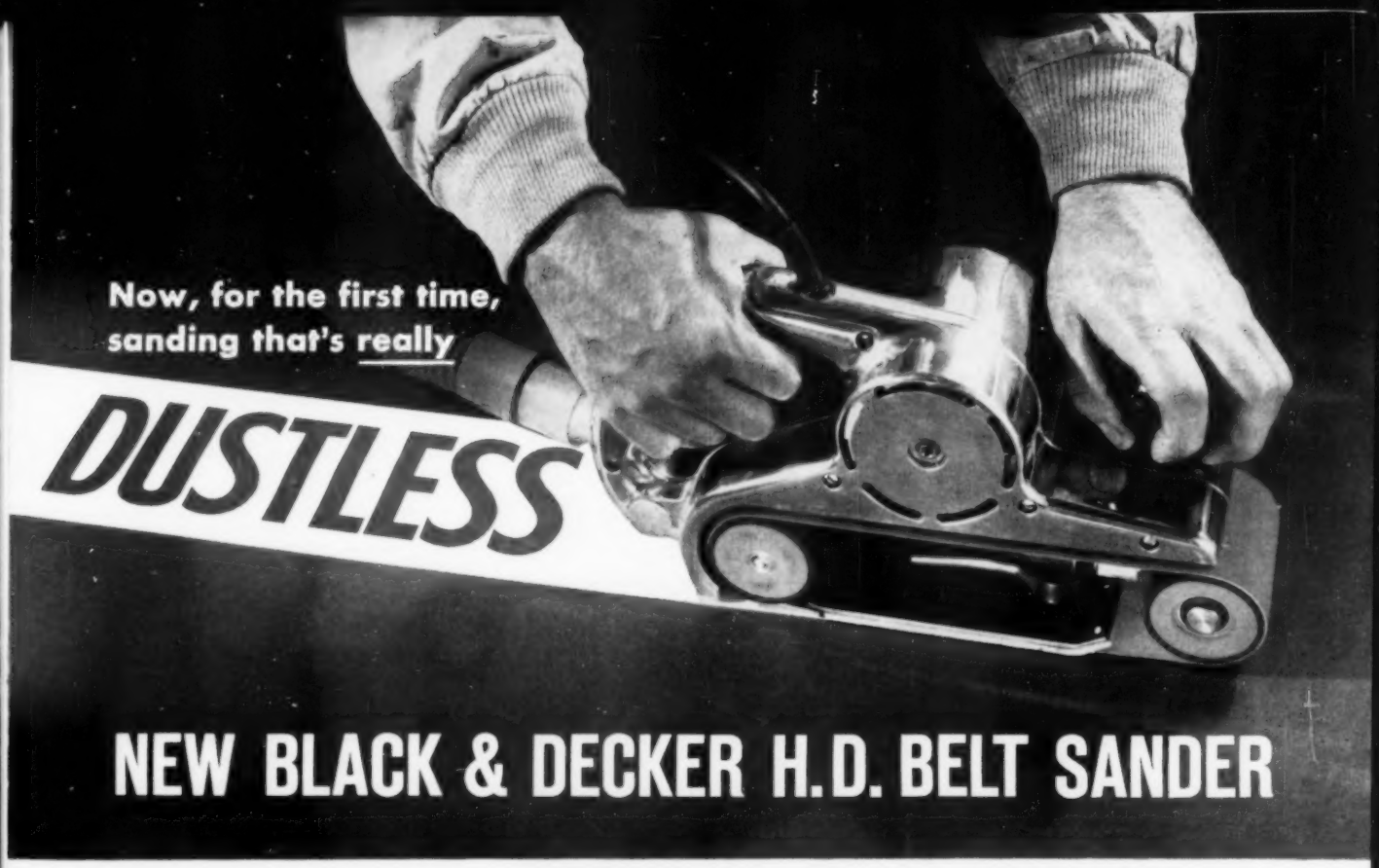

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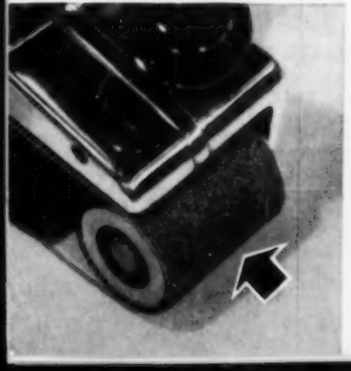

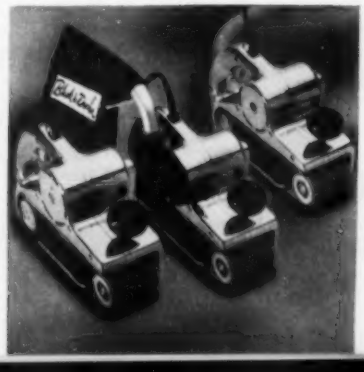

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ASSOCIATION NEWS

(Continued from page 6A)

and district leaders are U. L. Hiatt, Robert Armagast, Jess Schmitt, Arthur Ohanian, Harry Slater, Don Spangsbert, and A. N. Shaw.

The safety committee consists of Eric Holland, chairman; Alan Lytle, secretary; O. M. Friesen, Perry W. Knight, and Joseph S. Chick.

EPSILON PI TAU — NU CHAPTER

The Annual Banquet and Business Meeting of the Epsilon Pi Tau Fraternity, Nu Chapter, Rutgers University, New Brunswick, N. J., was held on Friday evening, May 16, 1958, and was highlighted by the presentation of two Laureate Awards, examination of five candidates, and installation of new officers.

Dr. Frank Stover, assistant commissioner of education, State Department of New Jersey, addressed the group on the subject "Educational Statistics, What They Mean to You and Me."

Dr. Henry C. Herge, dean of the School of Education at Rutgers University, and newly appointed Sponsor of Nu Chapter, presented Laureate Awards to George W. Morgenroth, director of the Essex County Vocational and Technical High Schools, and H. Allen Laushear, supervisor of industrial arts at Union Public Schools for their outstanding contribution to industrial arts and vocational education.

The apprentices honored at this dinner will be initiated in October. They are Nicholas Altieri, Nelson Beebe, Jr., Walter Buist, Eugene Dresdoff, and J. Alfred Seitz.

Newly elected officers for 1958–1959 are: Kenneth Charlesworth, president; William O'Rielly, vice-president; and Herbert Birch, secretary-treasurer. — *Charles F. Green, public relations.*

EPSILON PI TAU INSTALLS BETA-EPSILON CHAPTER

Dr. William E. Warner, founder, installed the Beta-Epsilon Chapter of Epsilon Pi Tau at Northern State Teachers College, Aberdeen, S. Dak., April 26, 1958. Twenty-one were initiated as charter members.

In addition to Dr. Warner, special guests at the installation banquet were Mrs. Lemana Heckmann and Prof. and Mrs. H. P. Gerber. Mrs. Heckmann, Aberdeen, is the widow of the late Prof. M. W. Heckmann, first head of the industrial-arts work at Northern State. Prof. Gerber is the recently retired chairman of the division of industrial arts at Northern State.

The Laureate citation was awarded to Dr. Harry Gunderson, the current chairman of the division of industrial arts at Aberdeen.

IOWA INDUSTRIAL EDUCATION ASSOCIATION

The Iowa Industrial Arts Association and the Iowa Industrial Education Association completed final details for a merger of the two groups on April 11, 1958.

The combined group will be known as the Iowa Industrial Education Association.

The board of directors of the new organization is made up of a combination of the directors of the old associations. All projects of both former associations will be completed. — *Merle O. Wiener, President.*

NEW ENGLAND MEETING

The New England Industrial Arts Teachers' Association will meet at the Eastland Hotel, Portland, Me., on November 14 and 15, 1958. — *Dwight R. Parker, Publicity Chairman.*

KENTUCKY'S ANNUAL CONFERENCE

The Kentucky Industrial Education Association will hold its next Annual Conference on Friday and Saturday, November 7 and 8, 1958, at the Kentucky Hotel, Louisville, Ky. — *Orin R. Robinson, Chairman, Public Relations Committee.*

OHIO INDUSTRIAL ARTS ASSOCIATION

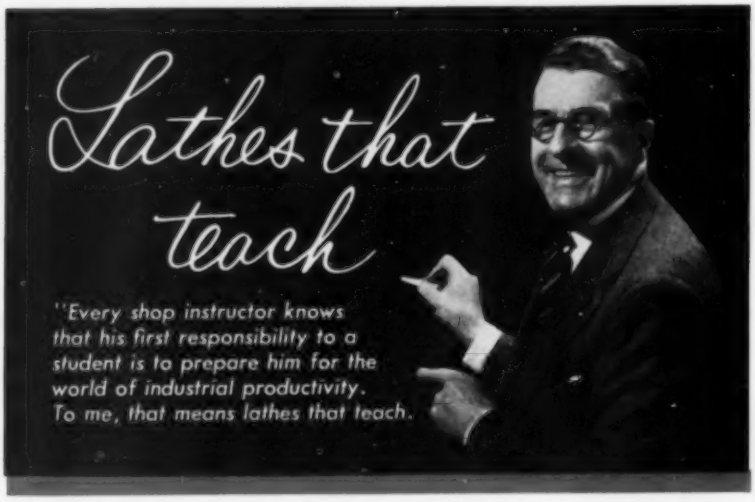
The annual convention of the Ohio Industrial Arts Association will be held at the Neil House Hotel, Columbus, Ohio, on March 19, 20, and 21, 1959.

The officers serving this group are: president — R. O. Knight, Board of Education, Columbus; vice-president — Howard I. Shull, Ohio University, Athens; treasurer — Dean Kittle, Cairo; secretary — Robert Boyer, Cleveland; commercial exhibits manager — R. S. Drafenbaugh, Newark; school exhibits manager — G. R. Horton, Urbana; news letter — Darwin C. Eaton, Swanton, Ohio. — *Robert B. Boyer, secretary.*

TENNESSEE OFFICERS

Lauton Edwards of Park Junior High School, Knoxville, Tenn., was elected chairman of the Tennessee Industrial Arts and Trade and Industrial Education Association at its Spring convention in Memphis.

Other officers elected were: W. R. Romine, Central High School, Murfreesboro, vice-chairman; J. L. Dune, Milligton Central High School, Memphis, secretary.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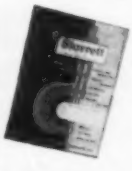

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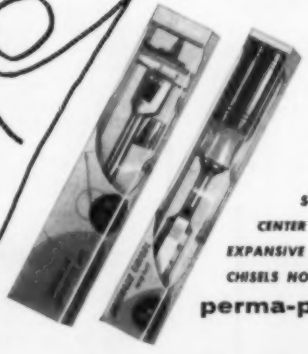

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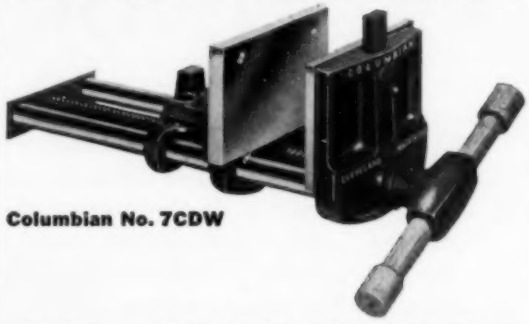

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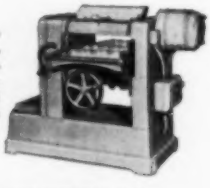

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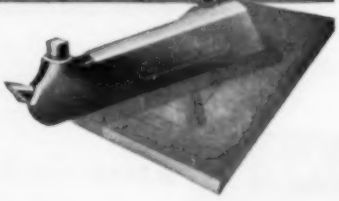

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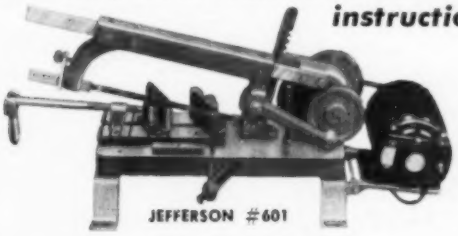

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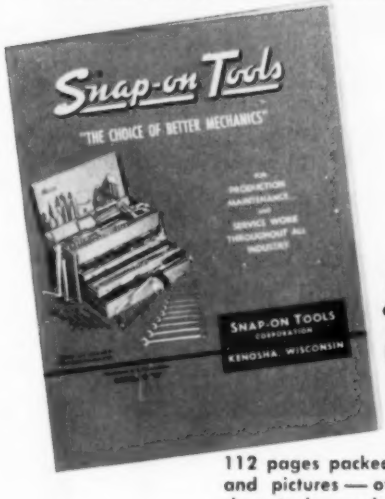

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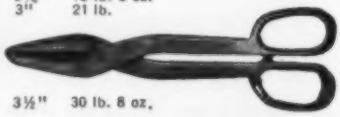
DS10	10"	2¼"	14 lb. 4 oz.
DS12	12¾"	3"	21 lb. 9 oz.

CIRCULAR PATTERN

DC 7	7"	1¾"	6 lb. 6 oz.
DC10	10"	2¾"	13 lb. 8 oz.
DC12	12¾"	3"	21 lb.

COMBINATION PATTERN



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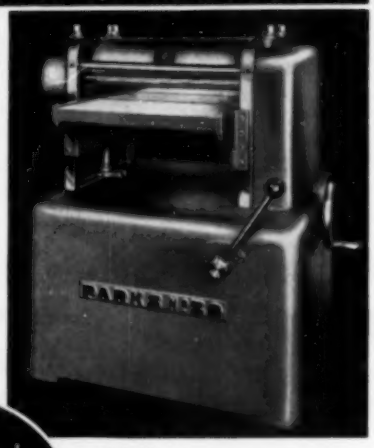

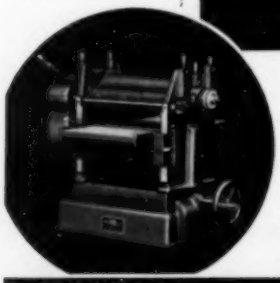

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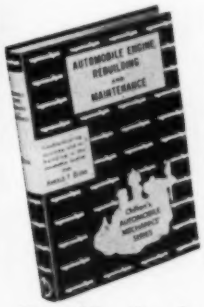

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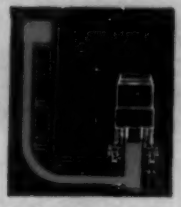
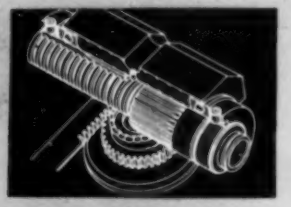
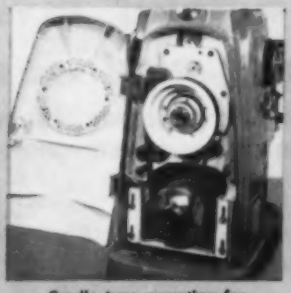


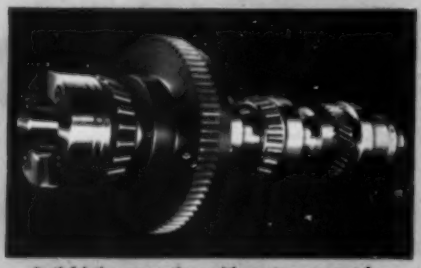
Vertical screw is submerged in a bath of oil from its own reservoir, assuring long, accurate life.



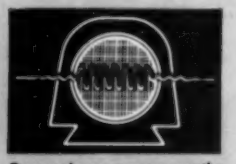
Automatic backlash device increases productivity. Machine can mill equally well as the table feeds to the right, left or alternately right and left.



Cradle type mounting for spindle drive motor.



Anti-friction mounting with center support for heavy spindle assembly.



Dynapoise overarm smooths out the cutting action; provides straight-edge alignment for arbor supports.

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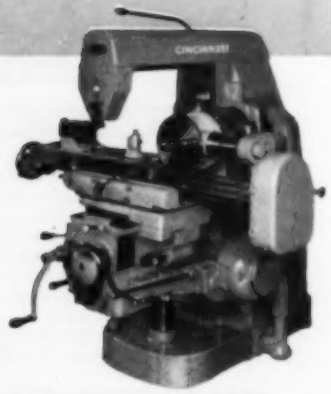
Size	No. 2ML		No. 2MI			No. 3MI	
Style	Plain	Univ.	Plain	Univ.	Vert.	Plain	Univ.
Longitudinal Range...	28"	28"	28"	28"	28"	34"	34"
Sixteen Spindle Speeds	25-1500 rpm all sizes and styles (higher and lower ranges optional)						
Sixteen Feeds.....	¼-30" per min., all sizes and styles						
Motor Drive: Spindle..	3 hp	3 hp	5 hp	5 hp	5 hp	7½ hp	7½ hp



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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
SEPTEMBER 1958

Industrial Arts for Grades K-6

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Professor, Industrial Arts Education
State University of New York
Teachers College at Oswego
and
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DeKalb, Ill.

Recent years have seen the accelerated growth in popularity of industrial arts at the K–6 level in a number of states. This rapid growth has given rise to many questions concerning the movement and its significance.

Definition. Industrial-arts activities in the elementary school serve one principal purpose. That purpose is to assist in the achievement of the generally accepted goals of elementary education. *The unique contribution of industrial arts at this level is the providing of firsthand experiences with processes and products of constructive endeavor with material things.*

Justification. Industrial-arts activities provide many avenues to the achievement of educational goals. The most significant of these is the establishment of more adequate meanings. Through firsthand experience with work, machines, mass production, industrial technology, automation, and many other abstractions children must establish meanings which are vital to their welfare. In more technical terms, this process is the reduction of levels of abstraction to the point where they can be *handled* by children.

Among other avenues to the achievement of educational goals provided by industrial-arts activities are these: (1) extending interests and developing talents beyond the limits imposed by mass education in a purely *academic* setting;

Fig. 1 (left). A home-made, child-size workbench. Materials in this bench (exclusive of vise) cost less than $15.00. Fig. 2 (right). Terrain discussed in social studies takes on added dimension through construction work

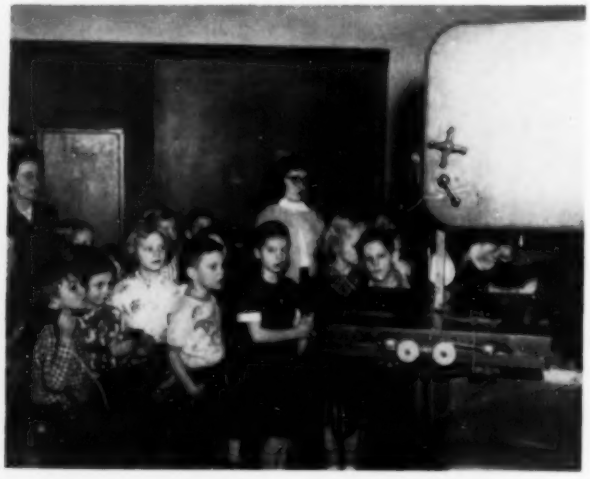


Fig. 3 (left). Pupils put finishing touches on classroom furniture constructed from free and inexpensive materials. Fig. 4 (right). Youngsters observe the power of machines on a field trip to an industrial shop

(2) providing opportunities for one kind of creative expression; (3) helping to orient the child to his increasingly technological environment; (4) helping to make school (and the whole process of learning) more fun; and (5) helping teachers to discover and deal with individual differences. *In short, these activities, properly performed, improve learning.*

What Sorts of Activities?

A prescribed list of activities would be inconsistent with the point of view expressed above. Any activity which involves processes and products of constructive endeavor with material things is appropriate if it assists in the achievement of educational goals. In order to assist in the achievement of these goals, activities must grow out of the curriculum and *be continuous with* other classroom work. A few examples of possible activities are: (1) making enclosures for pets, as part of a unit on *LIVING THINGS;* (2) visiting a house-construction site as part of a unit on *HOUSING;* (3) making a model highway intersection as part of a unit on *TRANSPORTATION;* (4) canning or freezing fruits as part of a unit on *FOODS;* and (5) constructing a model post office as part of a unit on *COMMUNITY SERVICES.*

Fig. 5. Cutting "plastics" on a safe, vibrating-type jig saw

More Than Correlation

The term *correlation* does not suit the concept of industrial arts described here, because *correlation* implies the existence of two or more *things* which must somehow be related. It is believed, on the other hand, that any industrial-arts activity which is appropriate must have *grown out of* the elementary curriculum.

Where done? The great majority of industrial-arts activities should be carried on in the regular classroom. There should also be, however, an elementary industrial-arts laboratory in the school. *Both classroom facilities and laboratory facilities are needed for an adequate program.* The laboratory serves as *headquarters* for the industrial-arts consultant (whose function is referred to below). It serves also as a reservoir for supplies and tools, and as a workshop for projects and activities which are beyond the scope of the classroom.

Who does it? Industrial-arts activities should be under the guidance of the classroom teacher. The classroom teacher should work closely with an industrial-arts consultant. The consul-

Fig. 6. Inservice teachers find they can do it – and they enjoy it too!

tant should serve primarily as a *helping teacher*, resource person, and coordinator of industrial-arts activities. To do this effectively, he must have not only a broad technical background, but also a thorough understanding of the elementary school and young children. Consultant and classroom teacher, working together, provide well coordinated industrial-arts activities which are *an integral part* of the total classroom program.

Interest in this field is growing. Rapidly expanding public school enrollments are stimulating new school construction. Plans for such construction should include provisions for work of the nature described here. As new junior-senior high schools are being completed, many buildings which formerly housed grades 7–12 are being converted to elementary schools. Such buildings already have shop and laboratory facilities, including tools and equipment, which can be easily converted for the use of grades K–6.

It's not new. Elementary school teachers have always sought more effective ways of helping children to gain fundamental skills and basic understandings. There has been a marked trend for many years to utilize activities with tools and materials in situations which illuminate, illustrate, enrich, and vitalize the curriculum. Elementary industrial-arts activities, whether called by that name or some other, exist solely to help make education better.

The Mass Production Technique of Teaching Industry—Part II

HARVEY SCHAFFER
Junior High School 139
New York City, N. Y.

The problems of what to teach, and how to teach, have always been of prime importance in all fields of education. This is equally true in science, mathematics, and in industrial arts. Because our society is constantly changing, the content of our courses, and the method of teaching them must also change. Before a new technique becomes an established method it must be tried out in a number of different situations, evaluated, and then applied again.

The method described in this article is a continuation of "The Mass Production Technique of Teaching Industry," as it appeared in the December, 1957, issue of this magazine. While the first article explained the basic theory, this article shall describe the application of a lesson in mass production.

Introducing Mass Production

The study and interpretation of industry is certainly one of the prime functions of industrial arts. In our metal shop at Junior High School 139, in New York City, one method of studying and interpreting industry is to have the pupils actually try out industrial practices in the classroom. One example of industrial practice — mass production of a useful article — is presented to the class after they have completed one basic project. The basic project for my seventh grade classes was a sheet-metal book end. The completed book ends were placed side by side on a table top and I asked the class for their general opinion of the finished book ends. After several comments one boy said, "All the book ends are a little different. No two are exactly the same." At this point we discussed the importance of products being exactly the same. Light bulbs and sockets were used as examples. The class clearly understood the necessity of standardized sizes and duplicate parts. In answer to the question of how this standardization is accomplished, several boys said in a factory — others said by machines; and two boys said through mass production.

The discussion was stopped at this point, and an assignment was given. The assignment should preferably be an integrated one. The social studies teacher and I decided to relate the mass production assignment with the social studies unit on "Beginnings of America." The class was divided into three groups for the purpose of this assignment. Each group was to report on the contributions mass production made in the seventeenth, eighteenth, and nine-

teenth century with respect to the growth of the United States.

The group reports provided the class with a basic understanding and appreciation of mass production. At this point I introduced the possibility of the class mass-producing an article. The class responded favorably and the problem immediately encountered was one of deciding what to mass produce.

The Mass-Production Committee

Everyone had his own suggestions and it was evident that the class must elect a small group to decide for them. The elected committee also had the responsibility of planning, preparing, and evaluating production of the article. The elected committee decided to mass produce the same book ends that they had constructed as a basic project. I was surprised at their choice but the many advantages of mass producing the basic project became evident. In fact, I suggest that the first mass production experience for your class be the mass production of the basic project or a similar project. This will enable the students to compare the quality of the articles and the methods of production.

A conference between the elected committee and the teacher is necessary to prepare and acquaint the mass production committee with their task. (See chart, Fig. 1.) During the three weeks following the conference the mass-production committee is excused from their classroom work and concentrate on their specific jobs. It should be clearly understood that the amount of preparation depends entirely on the ability of the class. In preparing for mass production the committee did the following in the listed sequence.

Engineer

Decide on project
Draw plans (see Figure 2)
Design jigs and fixtures
Prepare work stations
Production flow chart acts as inspector

Production

Decide on project
Construct templates
Cut rough stock
Construct pilot model
Prepare list of jobs
Train workers
Prepare work stations
Prepare production flow chart
Act as inspector

Business

Decide on project
Draw posters (see Figure 3)
Compute costs (see Figure 4)
Prepare and evaluate time study chart (Figure 5)
Prepare work stations
Act as inspector

The preparation of the work stations by the mass-production committee enabled every member of the class to perform their operations on the book end at the start of the mass production session. If the various stages of the book end were not prepared in advance many man or rather boy hours would be wasted. A production flow chart is another essential consideration. The soldering table and paint area are on opposite ends of the shop, and would necessitate walking the length of the

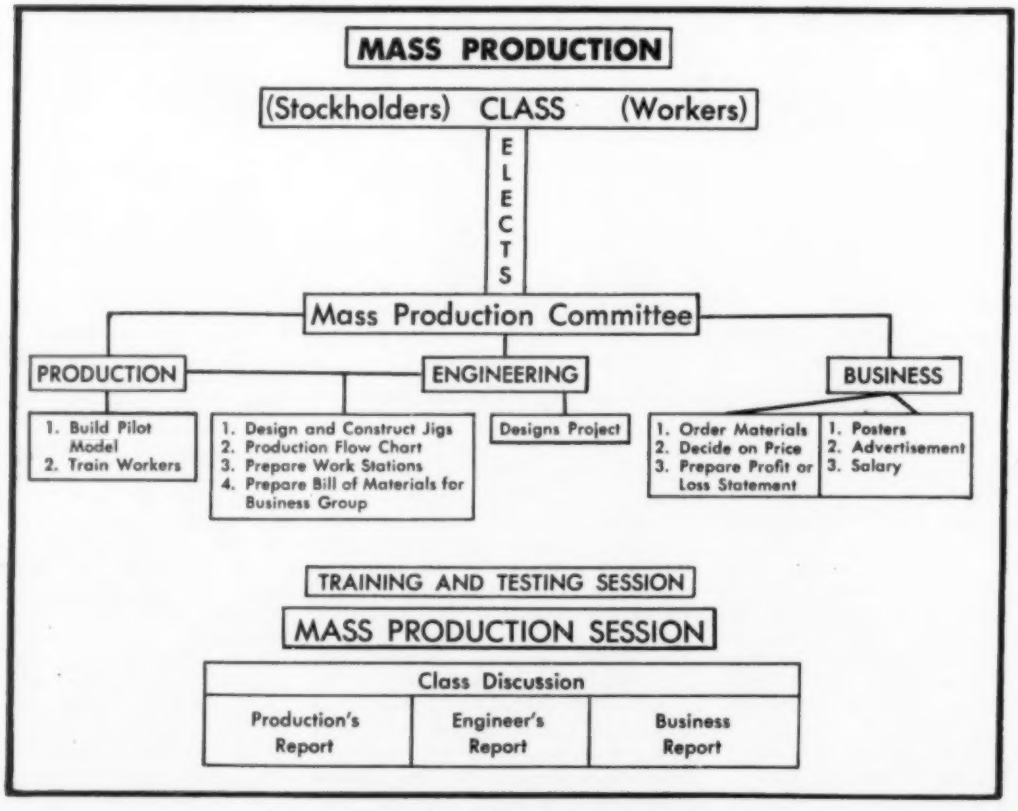


Fig. 1. The task of the production committee

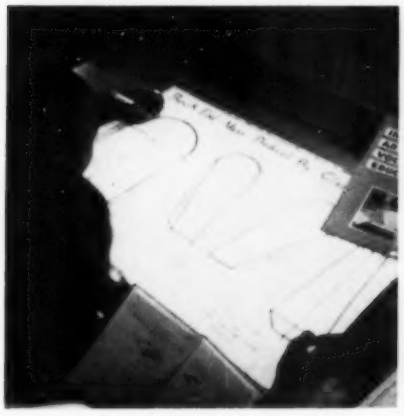


Fig. 2. Engineer drawing the plans

Fig. 3. Business committee work up the advertisements

Fig. 4. Business group figuring the cost of material

shop for each book end. The production flow chart (Fig. 6) shows the solution. The paint area and brake are permanent, therefore the soldering operation should be situated near the paint area and the brake. A small planning center table, covered with asbestos board, served perfectly.

The Production Session

The reward for all of the pupil and teacher planning is contained in the production session. The energy, enthusiasm, and appreciation displayed during the production session is ample reward for the teacher's preparation and organization. The pupils entered the shop and went directly to their work stations. Several problems arose. Three boys were absent: a painter, neck layout, and a fill-in. In addition a new admission was assigned to my shop. The new admission became the painter and a second fill-in did the neck layout. After one minute of instruction both

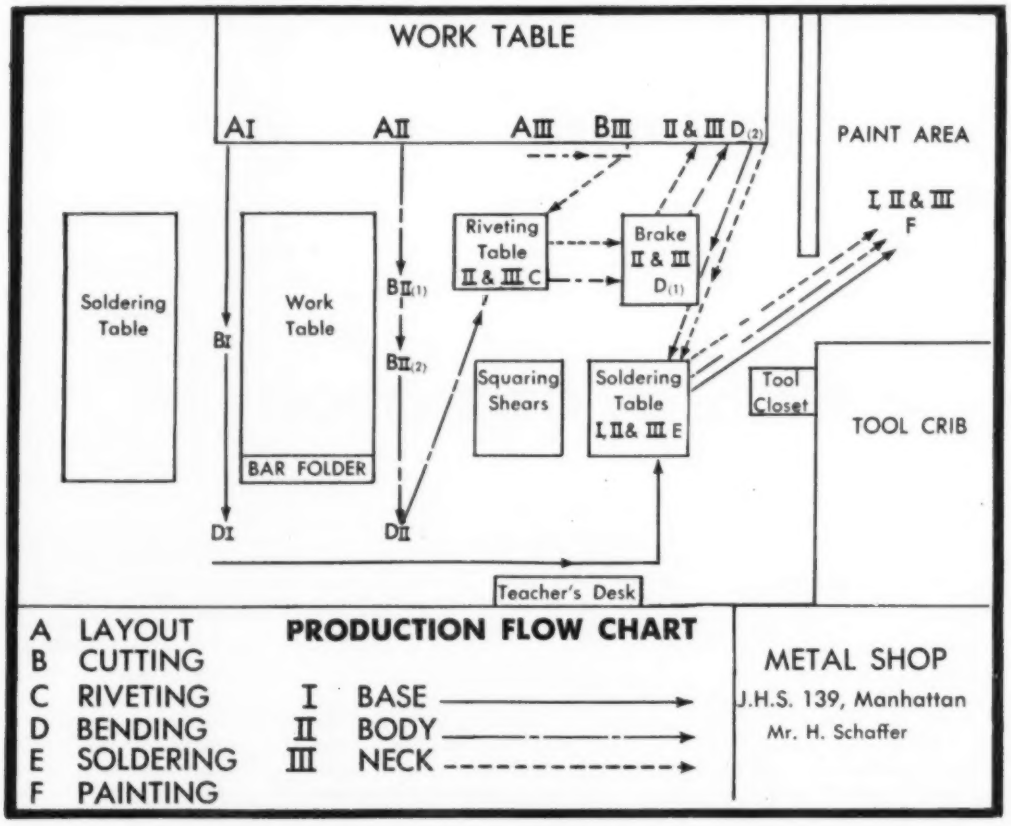


Fig. 6. Production flow chart

Fig. 5. Discussion of the time chart conducted by the production foreman

boys knew their job. The production actually started at one-thirty, and ended at two forty-five (see Fig. 7). This enabled the class to finish the general cleanup and to view the 48 book ends on the drying racks. The class was surprised and pleased with the results of one hour and fifteen minutes of production work. The following day the book ends were distributed by the mass-production committee.

Discussion and Evaluation Session

The class discussion was the most educationally rewarding aspect of this experience. The discussion was led by the mass-production committee. The engineer, business, and production groups presented their reports and discussed their reports with the class. Our twelve-year-old production foreman's report is typical of the mass production committee reports. "The mass production of book ends was very successful. Each man knew his job and each man did it. Each one of the men were very good in his field of work, they had to be. The *skedule* for the production was exactly 75 minutes and it was pretty good to turn out 48. Each man was working steadily but rapidly. Each man had no precise time in doing his job but he was working hard. Each piece was made in about three minutes. Every five minutes the man near the blackboard would have to check with the painter who was the last job man and could count the amount for the time study chart. . . ."

The class desired to repeat the mass production experience before the end of the term. Undoubtedly the second experience would run more smoothly than the first. However, relatively little would be gained educationally. In evaluating the experience the entire class was asked two questions. What was your general opinion of the mass production experience? What was the most important thing you learned from mass production? The following are some of the answers given by the seventh grade pupils:

"1. I think that the mass production was successful but could have been better.
I think the mass production was successful and I liked it.
I think its wonderful and saves a lot of time.
2. I learned how big business firms operate their production.
I learned how to use tools and to work together.

Fig. 7. Seventh graders find out about industry

I learned to do the job better than I had done.
If everybody works together they produce more things.
I don't think I learned anything much."

It must be emphasized that the mass-production experience is primarily a method of interpreting industry. It is certainly not the only way you can interpret industry. Films, lectures, industrial visits are all satisfactory methods of bringing industry into industrial arts. A metal tie pin, wooden corner shelf, plastic light pulls, ceramic ash tray, or leather coin purse are all excellent beginning mass-production projects. Try this teaching method with your classes next term, and be sure to include a mass-production experience as a permanent feature of your industrial or vocational shop program.

Coeducation Wood Shop

WILLIAM G. POOLE
Lincoln Junior High School
Santa Monica Unified School District
Santa Monica, Calif.

Feeling a need in our curriculum for boys and girls working together in industrial arts and homemaking, we, at Lincoln Junior High School, started a course three years ago. This program has been working successfully for six terms now and we feel the experiences for teachers and pupils alike are most rewarding.

In the woodshop this course was planned on a ten-weeks basis with clearly defined objectives. Our objectives were set up to provide experiences in safety procedures, use of hand tools, wood finishing, related information, and cleaning and care of work area. The second ten weeks of the semester was in the foods room with specific objectives set up by the teacher taking care of the foods room.

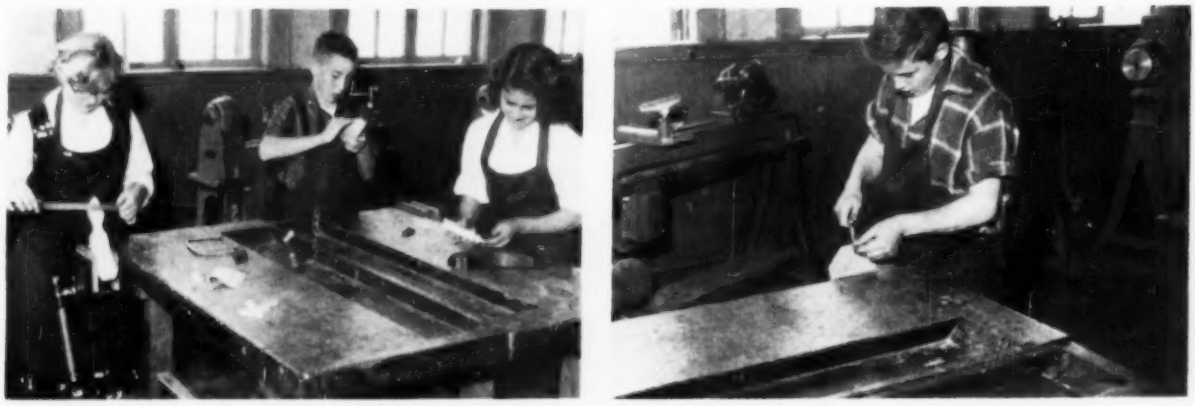
In approaching this new program a survey letter was sent home to the parents explaining the purpose and objectives of the course.

Sample letter sent to the parents.

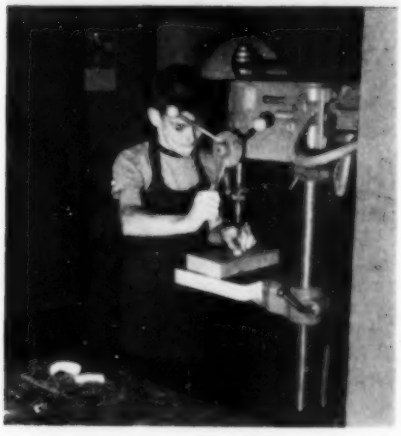
LINCOLN JUNIOR HIGH SCHOOL

Dear Parent:

Lincoln Junior High School is considering offering coeducational courses for A-7 students in wood shop and foods, Spring semester, 1956. We feel that such a course will offer much for the students. Below are listed some of the objec-



Boys and girls working together in industrial-arts woodshop course at Lincoln Junior High School



Students learn the use of tools, and follow safety procedures

tives that we propose for this course.

To provide experience in:

A. Wood shop
   1. Safety procedures
   2. Use of hand tools
   3. Wood finishing
   4. Cleaning and care of work area

B. Foods
   1. Choosing food wisely
   2. Safety in the home
   3. Manners for all occasions
   4. Techniques in preparing and serving breakfast
   5. Care and cleaning of kitchen and kitchen equipment

We are interested in your reactions to this course. Would you please indicate on this sheet any suggestions or possible objections you might have.

COMMENTS:

(Student's name)
(Parent's signature)

A great majority of the responses indicated that the parents were in favor of such a program.

"I think it would be a wonderful experience for the girls."

"Since these are courses to prepare for future homes, it seems most logical it be coeducational. I sincerely approve."

"I am happy to see this program presented to our youngsters. Besides the fun and skill development it helps them understand and respect each other more."

"It seems like a very good idea as women are also interested in safety around the home and making small repairs."

"I'm all in favor of creating a generation of housewives who're capable of driving a nail to hang a picture."

Seventy per cent of the responses from parents were positive. The few against our proposed program expressed fears that there would be too much "fooling around." This has not been so.

In scheduling these classes on our master program parallel classes were set up by periods in seventh grade woodshop and seventh grade foods. The first

day the woodshop teacher exchanged half the registered boys in his class with half the girls registered in foods. This maintained a nearly equal ratio of boys and girls in each class. At the end of the work period the woodshop and foods classes were exchanged.

In the first year that we had this class it is true that we did screen the students participating by rescheduling those who did not want to be in the class. In the past four semesters we have increased the number of classes and the class is considered "required." It is true that our boys often resent or balk at the idea of going into the foods room. However, the foods teacher says that those who "howl" the loudest are her most enthusiastic converts.

The boys and girls together in woodshop have done much to change standards and work habits in our shop by comparison to classes I have of boys alone.

This class is on the seventh grade level and, due to the advanced maturity and development of the girls, I find they seem to raise the standards of our class work. It often keeps the fellows busy to keep up or get ahead of the girls.

Through careful evaluation by parents, teachers, administrators and by students, we feel this program has been most rewarding and has possibility for even more growth.

From the students we get comments such as these:

"Now I know how to take a nail out of a wall when it is stuck there."

"I think this class is the best — I wish I could do it again."

"I wish we had longer time."

"It is good for us girls to learn how to use tools. Gee, I didn't even know what a plane was when I went there."

From the teacher's viewpoint the level of work done in coeducational classes is often higher.

Our semester is generally closed with a short party. "Goodies" are served which are prepared by the foods class. The students are in charge of planning this program.

One possibility we are considering is making this exchange class with a practical arts course where simple home repairs may be included in our shop experience.

There is a demand from parents and students alike to learn simple techniques like fixing an electric plug or cord ends, refinishing furniture, hanging pictures, and learning further techniques in household care and upkeep.

Good Housekeeping in the Shop Begins at School

E. J. GIRK
Detroit, Mich.

With American industry spending millions of dollars annually to educate its employees in safety, health, and good shop housekeeping, it is not remarkable to find our industrial education programs in the public schools emphasizing these principles, not just as virtues in themselves, but as important parts of a good vocational education program.

This, certainly, is true in the extensive shop facilities of the Detroit public school system. Here the skilled craftsmen, the foremen, and factory managers for the automotive industry of tomorrow are receiving their important basic training. And here, too, the schools are stimulated and inspired by close proximity to some of the world's most advanced manufacturing operations.

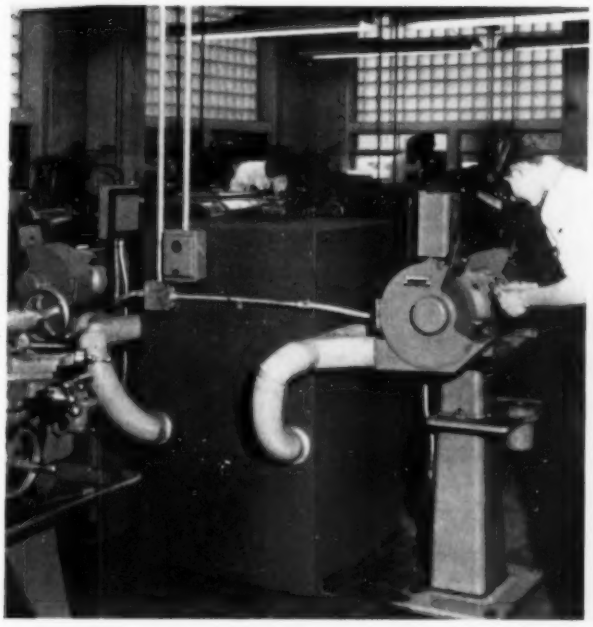
An example of this thinking is the concentrated attention Detroit school officials have given to the problems of dust control in school shops. As Earl L. Bedell, Divisional Director of Vocational Education, said:

Fig. 1. Dust collector used as a bench for a double end grinder at Detroit's Cody School installation

"Obviously, our first concern is to control dust in order to insure the health and safety of our students. Another important consideration, however, is that by using effective dust control, we can teach our students, by example, that good housekeeping practices are important and that dust is injurious to machines as well as to men."

Dust collection is being handled currently in many Detroit schools by the *unitized* type of dust collector, made by the Torit Manufacturing Company, St. Paul, Minn.

Experience in Detroit and elsewhere has shown that the flexibility of unitized collectors, as opposed to central systems, is particularly suitable to school shop operations. When each machine (or group of machines) has its own dust collector, the collector can be tailored to the operating requirements. It can be located conveniently, without expensive structural changes. If the machine is moved, the dust collector can be moved right with it. If new machines are purchased, new dust col-



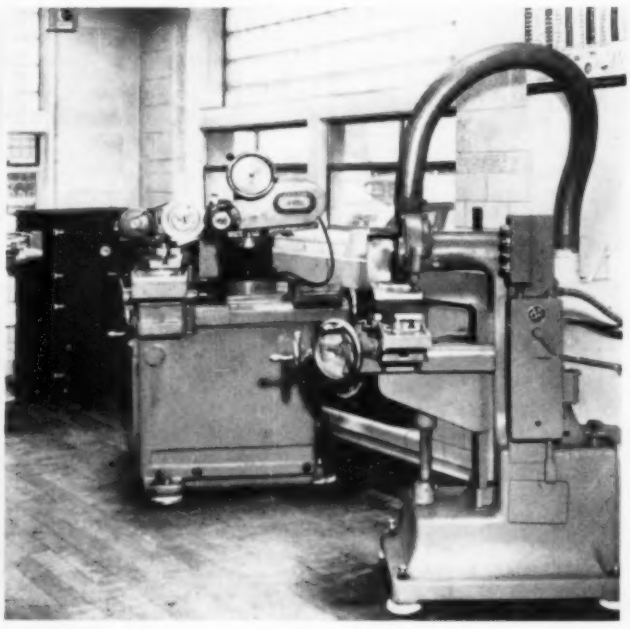


Fig. 2. Dust collector connected to two double end pedestal grinders in Cody Machine Shop, Detroit, Mich.; at right, Fig. 3. Dust collector services a surface grinder

lectors can be added at the same time. And the collector operates only when the machine is used.

A typical Detroit installation is at Cody High School where both Torit cabinet cloth filter type collectors and Torit cyclone separators are used.

The cabinet type, with high performance cloth filters, is used at Cody on typical machine shop grinders. Especially suitable for gritty dust, the collectors draw dust-laden air into the cabinet directly from hoods surrounding the grinding wheels. Heavy particles fall immediately into a dust tray under the filters. Fine dust particles are trapped on the outside of the filters, where most fall freely into the tray when the machine is stopped. The rest of them can be shaken loose by a foot pedal, located outside the cabinet.

The clean, filtered air from the self-contained units is discharged back into the room, thus avoiding wasteful discharge of heated air to the outdoors.

Two of the Cody High School installations illustrate the versatility of unit-type collectors. In one installation, the collector cabinet itself is used at the pedestal for a double-end motor and grinding wheels. A mounting arrangement, designed and built in the school shop, is used to bring the working level up to the height of an adjoining workbench.

In another application, a collector serving a Gallmeyer & Livingston surface grinder is located well out of the way, in a corner some feet from the machine. The collector is connected with the machine by a square manifold, running unobtrusively along the wall, and has capacity to handle an additional grinder.

Fig. 4. Grinder connected to a dust collector as a part of Cody's vocational training facilities

Cody's woodworking shop uses Torit cyclone separator collectors, the most most efficient type for large quantities of dust. In these collectors, the dust-laden air is drawn into the top of the machine and, as the name implies, is directed into a whirlwind motion by spiral baffles. The strong centrifugal action precipitates the dust particles out of the air stream and they settle to a dust reservoir at the bottom of the machine. The cleaned air is drawn back up through a squirrel-cage blower and exhausted.

The results from this equipment? Well-groomed school shop areas; a clean, healthful atmosphere in which to learn; and no abrasive dust to wear out machines and tools and reduce work quality.

And then there is an important by-product — a permanent working demonstration for students of the importance of dust control in a safe and efficient shop.

◆

UNIFORMITY IS ASSURED

At the exit end of a hot strip mill, for example, an infra-red device and an X-ray gauge record the width and thickness respectively of steel strip flashing by at speeds up to 2000 feet per minute. Without touching the strip, they automatically adjust the mill's tension stands to assure product uniformity.

At a West Coast steel plant, a non-contacting thickness gauge uses atomic energy.

The influx of scientific devices recently led one steel executive to say that they "will lead to greater progress during the next 10 years than has been achieved in the first 100 years of steelmaking in America." — *Steel Facts.*

Vocational Education at the California Institute for Men

L. G. WINES
Supervisor of Vocational Instruction
Department of Corrections
California Institution for Men
Chino, Calif.

On July 10, 1941, the California Institution for Men opened its gates to the first bus load of 34 adult male offenders of California. This institution, one of the nine units of the California State Department of Corrections under the able leadership of Richard A. McGee, gave penology the first institution founded under the philosophy of freedom in working with adult felons. This new philosophy, which has keynoted all aspects of the operation of the institution, is based upon the concept that there can be no regeneration except through freedom. Rehabilitation must come from within the individual and not as a result of force.

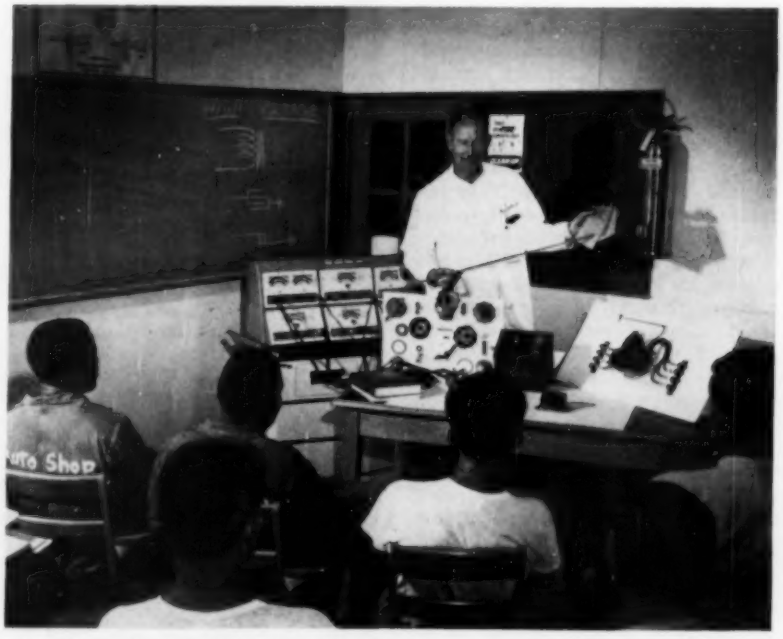
"The training and treatment men receive in prison will determine to a large degree their success or failure on parole. Individuals change slowly; therefore, the process of adjustment must be gradual. It's easy to be good with a gun in your back when you are told what to do and when to do it. It's quite another thing to have to accept responsibility you are expected to assume in a free world outside walls."[1] The latter concept is embodied in the Chino philosophy of freedom.

Through the progressive leadership of Kenyon J. Scudder, Chino's Superintendent from 1941 to 1954 (and more recently under the administration of Fred R. Dickson and E. J. Oberhauser) Chino is pointing the way to a new era in working with adult offenders while expanding its facilities to keep pace with the growing needs of its increasing population now numbering in excess of 1700 men.

Adults committed to prison through the courts of California are received in Reception-Guidance Centers of the California Department of Corrections. These centers are designed to function as guidance and counseling agencies. They serve the individual man by providing the initial recommendations essential to the rehabilitative process. These recommendations are a result of psychiatric, social, and physical studies co-ordinated with academic, aptitude, I.Q., and interest tests as evaluated by specialists in each of the respective areas.

This guidance and counseling process, extending over 60 days, culminates in the blueprint for guiding each man as he rebuilds his life for return to society as a productive and useful citizen in our American way. The data assembled by the Reception-Guidance-Center technicians is carefully analyzed. At this time it is determined which of the institutions of the department of corrections possesses the facilities necessary to adequately provide the opportunities basic to the individual requirements.

Men who are received at the California Institution for Men find themselves in an environment which provides a freedom of action designed to stimulate a desire to begin building constructively for the future. At this point the academic and vocational opportunities offered by the education department are made known to the men. It is the responsibility of the administrative personnel of the department of education to interview each new man, discussing with him the contents of his blueprint for a new life as recommended by the Reception-Guidance Center, and to as-



Technical related training is a phase of instruction in all vocational classes

[1]Kenyon J. Scudder, *Prisoners Are People* (New York: Doubleday & Co., 1952), p. 27.

sist him in designing a program which will meet his individual needs in terms of his interests and aptitudes. He is given an opportunity to participate in one of three programs.

1. Attend academic school classes for one-half day and work at the convenience of the institution the other half-day.
2. Attend vocational training classes on an all day basis.
3. Work all day at an institutional work assignment thereby forefeiting his opportunity for academic and/or vocational training.

Related technical knowledge and skills in the basic operations of the trade are recognized as an important and essential phase of our vocational training program. In a correctional institution, however, there exists another development phase related to vocational training which is extremely important, namely, that phase of training which incites individual enthusiasm for wanting to make the most of each educational opportunity. The value of the vocational training at CIM can be partially measured in terms of the skills and know-how of the trade which the trainee attains. Through group instruction and individual counseling the will to do the job is cultivated. One such motivating force at the California Institution for Men is a class in *personal self-advancement* through *job happiness*. The course is divided into two sections, each lasting for a period of four hours per week. The first section deals with the *skill of living*, and develops a new understanding of one's self in respect to others. The second section deals with *job happiness*. This section presents the job in three divisions, namely the blueprints of the job, or job requirements; materials of the job, or our own individual potentials; and lastly, the tools of the job, or human relations in industry. Through this method of presentation the inmate becomes aware of his own individual potentials for his particular job and he applies these potentials in working out job requirements. From this plateau he is introduced into the new era involving human relations in industry.

Upon completion of these two courses the inmate can begin to build his life upon his finer potentials and gradually see progress by making application of the principles involved to his particular trade. Thus, the inmate not only develops the skills of his trade, but also the will and desire to use these skills productively.

Through the co-operation of the Chino Unified School District, Chino, California, certified academic instructors are provided for day and evening classes. These classes include Grades 1 through 12, commercial subjects, drafting, music, public speaking, blueprint reading, shop mathematics, typing, accounting, and first aid. This co-operative effort between the Department of Corrections and the local school district provides for the issuance of regular high school diplomas to those who meet the requirements as established by the California State Department of Education. In addition it provides the opportunity for eligible veterans to receive high school diplomas via G.E.D. procedures.

The trade and industrial program of the institution had its beginning with the opening of the facility in 1941. Since that time it has expanded from a two-shop activity to its present eleven vocational shops, an arts and crafts shop, and two on-the-job training opportunities in baking and shoe repairing.

This expansion has been guided by a philosophy of vocational education which recognizes that men at Chino identify themselves as belonging to one of three basic groups with regard to occupational needs and objectives, interests, and aptitudes.

These are:

1. Men already skilled in a particular trade but who desire vocational instruction to maintain skills and to keep abreast of technological changes in their occupation which might affect their employability when released from the institution.
2. Men whose past work record has been marked by instability — "Jacks of all trades, masters of none" — and who need vocational training directed toward a semi- or full-skilled level which comes only through specific organized vocational instruction.
3. Those who have never experienced the opportunity for learning a trade and whose working life has been marked by unskilled activities. These men may require a program permitting exploration and tryout and finally with specific trade training in terms of discovered interests and aptitudes.

Men in groups two and three comprise approximately 85 per cent of the Chino population.

Through 15 years of growth and development of vocational training at Chino, the Department of Corrections has been cognizant of the value of utilizing the services of experts in the respective trade areas through the organization of trade advisory committees representing management, labor, and apprenticeship.

Correspondingly, vocational curriculums have been designed to meet the needs of industry and to insure that the training offered will adequately prepare men for successful employment upon parole. As of July 1, 1954, vocational instructors, by examination and appointment, became State Civil Service employees certified by the California State Department of Education with Special Class "A" Vocational Credentials in Trade and Industrial and Public Service Education. At Chino each vocational

A portion of the body and fender shop. All vehicles are repaired for State agencies

Major and minor repairs are carried to completion and repainting as a portion of the training

instructor is a journeyman or master mechanic in his respective trade. The average occupational experience of each shop instructor approximates 15 years.

The vocational classes are held seven hours per day and are correlated with academic offerings on a quarterly schedule. Certificates of competence are issued to eligible trainees upon completion of training. Vocational evaluation reports are prepared by instructors for evaluation and placement purposes as an aid in establishing release employment.

In all vocational activities the administration has been alert to the importance of correlating training with maintenance. Education personnel have utilized every opportunity afforded them to co-operate with other functions of the Department of Corrections to enhance the vocational instruction. This phase will become more evident as we describe each vocational opportunity provided for our inmates.

Auto Mechanics — G. W. Einfeldt; Instructor

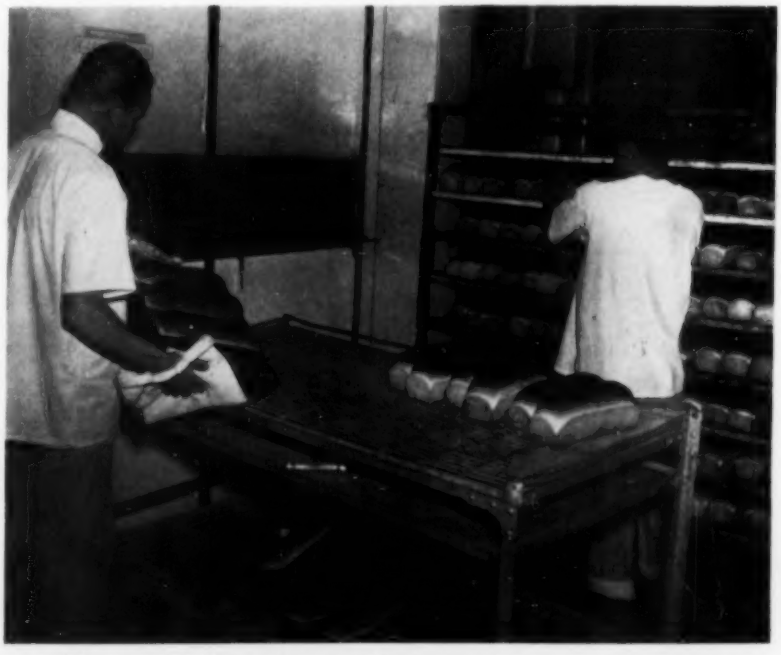
The auto mechanics program is designed and equipped to provide instruction for 20 men enrolled 7 hours per day. A minimum of 8 hours per week is devoted to presentation of technical knowledge. The curriculum includes power plant, chassis, ignition, carburetion, wheel alignment and balancing, lubrication, tuneup, and automotive maintenance.

Equipment includes overhead exhaust system, electrical tuneup units, reboring equipment, wheel balancing and headlight adjusting machines, electronic wheel alignment, steam cleaning and hydraulic lift facilities.

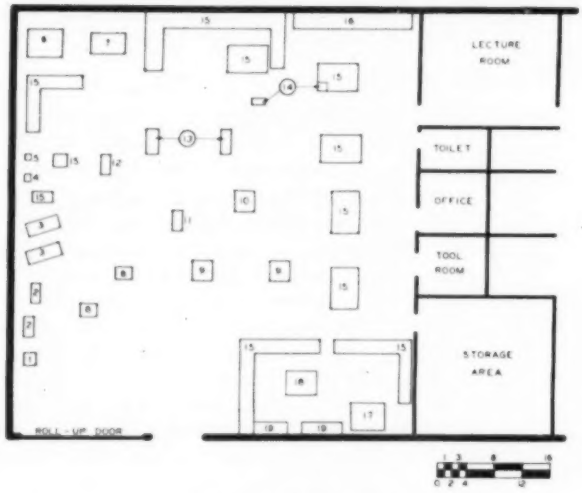
Opportunities are provided for specialized instruction in all areas. Emphasis is placed upon the ability to repair and maintain the modern vehicle. In this connection, problems are provided which call for an application of knowledge and skill. The education department has established a co-operative maintenance program wherein state owned vehicles are serviced, checked, and repaired. Service procedures are in effect which parallel those of a modern garage. This project insures an adequate source of late model vehicles where practical training is offered in unlimited variations. From tuneups to chassis and engine overhauls, even rebuilding of vehicles into new frames in co-operation with our body and fender shop are commonplace happenings in the program.

Arts and Crafts — C. E. Jones; Instructor

The arts and crafts shop provides an outlet for hobby interests of Chino men. Tools and equipment are accessible for ceramics, plastics, lapidary, art metal, leather craft, and woodworking. Classes in the various craft areas are conducted. Instructional schedules include guest craftsmen who demonstrate basic operations and display their finished projects. Each man who participates in the craft program purchases his own materials through procedures established for such procurement. Products of the activity are displayed for sale to visitors to the institution and earnings deposited to the credit of the craftsman. It has been proved that leisure time craft activities are relaxing and therapeutic as well as profitable. Many men released on parole find their craft interests are



Vocational baking receives enthusiastic endorsement of inmates interested in this vocation



Arts and Crafts Shop

1. Disk sander; 2. belt sander; 3. lathe; 4. Abalone grinder; 5. buffing wheel; 6. spray booth; 7. spray bench; 8. planer; 9. Unisaw; 10. shaper; 11. jointer; 12. jig saw; 13. band saw; 14. drill press; 15. table; 16. metal bench; 17. kiln; 18. potter's wheel; 19. storage bin

providing supplemental earnings to regular wages.

Body and Fender — Arthur Powers; Instructor

Twenty men enrolled on a 7 hour day basis comprises the vocational class in body and fender training. They are about equally divided between metalwork enthusiasts and those interested in automotive painting. Complete facilities have been provided to carry out an adequate curriculum in the trade. In addition to the regular hand tools of the trade, the students are provided with jigs and fixtures for door, fender, and hood panel repair, hydraulic body aligning equipment, pneumatic air hammers, chisels, cutters and sanders, metal spraying guns, and portable lifting units.

A complete modern spray booth equipped with water filter and temperature control is operated. Supplementing the booth is a temperature controlled tank for hot spraying, and complete paint mixing equipment. Students are taught the art of paint mixing and only base colors are purchased. All color matching, then, becomes a project in training.

Through the efforts of CIM, Correctional Industries (a separate entity of the Department of Corrections), and the State Department of Finance, an idea became a reality in 1951. A revolving fund, established within the Correctional Industries operation, provides for the purchase of materials and automotive components necessary in the rebuilding of wrecked vehicles. The materials and parts used are then billed to the State agencies requesting the repairs of such vehicles. Only State owned and operated equipment is repaired and refinished in this shop. All such repairs must first be approved by the Department of Finance Automotive Inspectors.

Here, then, is an example of how co-operation between existing State Agencies proves profitable to all concerned. The body and fender program processes in excess of 200 vehicles annually. It is evident that the independently functioning State agencies can co-operate on a project that is mutually beneficial and no better opportunity for learning the skills and technical knowledge provided. All makes and models are available. They are received in all manner of wrecked condition. The fact that the California Highway Patrol utilizes this vocational activity for the repair of its patrol cars is further evidence of the character of inmates engaged in training. There is no lack of confidence manifest here.

Bricklaying — H. H. Hill; Instructor

Within the construction trades area vocational bricklaying offers training on basic and advanced levels, providing daily instruction for twenty men. The course is designed to provide trade technical knowledge, shop mathematics, blueprint reading, and design in addition to basic trade skills. The practical aspects of the trade are emphasized with opportunities for experience through institutional projects. Throughout all vocational instruction in the shops the individualized teaching technique is applied.

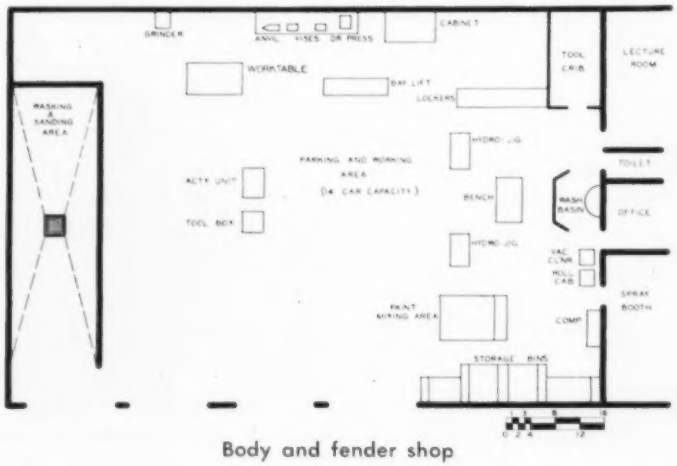
Carpentry — Ross Hurst; Instructor

The carpentry program functions cooperatively with the engineering and maintenance department of the institution. It utilizes a well-equipped shop provided by engineering.

At the present time plans are developing for complete modernization of carpentry training. Building trades councils and J.A.C.'s have sanctioned a program that will provide trainees with the opportunity to construct homes on a full scale basis. Initially three foundations will be provided. On these three foundations some 12 types of residential structures will be constructed to full scale. Following their construction they will be dismantled and materials used for new structures. Class "A" construction will also receive consideration with opportunities for practical application.

(To be continued)

The U. S. Army Corps of Engineers is constructing the U. S. part of the St. Lawrence Seaway Project. The Engineers also construct dams, electric power plants, maintain and operate rivers and harbors, and construct and maintain cemeteries. — *Wisconsin Military District Information Office.*



Body and fender shop

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

DR. WILLIAM F. RASCHE RETIRES

MILWAUKEE and the state of Wisconsin sustained a great loss when Dr. William F. Rasche, director of the Milwaukee Vocational and Adult Schools, retired on June 30, 1958, when he arrived at the compulsory retirement age of 70 years.

He had a most wonderful background of practical training that prepared him to teach in the field of industrial arts and vocational education. As a boy he helped his father who sold yeast, vinegar, pickles, and other items to grocery stores. Later on he worked as a carpenter, and as a sign painter.

Before he had finished his high school courses he taught school. During all of this time, he had dreams of more ambitious ways of spending his life, and he took courses at various institutions so that he was gradually prepared to blossom out as a full-fledged teacher.

Dr. William F. Rasche

He made a great success as a teacher, and incidentally, started industrial-arts courses in various smaller schools in the early days when that subject was first introduced in the schools of this country.

At the AVA Convention in 1957 at Philadelphia, Dr. Rasche received the Ship's Citation. This mentions his fifty years of service to education as teacher and principal in a country school, teacher on a Milwaukee County circuit, teacher and director in the Cudahy, Wis., Vocational School, teacher at the University of Pittsburgh, and teacher, supervisor, and director since 1940 of the Milwaukee Vocational and Adult School. The citation also mentions his services as chairman of the Milwaukee Metropolitan Youth Commission, and secretary of the Metropolitan Milwaukee War Memorial.

It also refers to his participation in the 1920 survey of vocational education in the Chicago Continuation School, and in the 1943 Strayer Survey of the New York City Schools.

Then it mentions Dr. Rasche's study in 1944 of the mechanical industries at the Tuskegee Institute, and his services in 1944 and 1945 as consultant for the job skills training program of the Civilian Training Branch, of the Industrial Personnel Division of the service forces of the army.

The citation also refers to the services rendered by Dr. Rasche as chairman from 1943 to 1945, of the classification and compensation committee of public employees, of the five units of government of the Metropolitan Milwaukee.

As the time of Dr. Rasche's retirement grew nearer, the citizens of Milwaukee began to realize, more and more, just what his loss to the vocational education system of Milwaukee would mean. Gone were the carping criticisms of some of the members of the board of school directors, and for once the citizens of Milwaukee went way out to honor Dr. Rasche wholeheartedly for what he had done for the youth of Milwaukee at the vocational school. He received great praise for the technical courses and the educational TV programs which he organized and which are broadcast from the Milwaukee Vocational and Adult Schools.

The Wisconsin State Board of Vocational and Adult Education at a luncheon at the Milwaukee Athletic Club, presented him with a citation which hailed him as "a true leader in vocational and adult education in Wisconsin, throughout the United States, and the world." It praised him for pioneering in all aspects of adult and vocational education, and for extending numerous educational opportunities to youths and adults alike.

The William C. Frye community service award is set aside to reward each year a person who has made an outstanding contribution toward making the city of Milwaukee a better place in which to live. This award for 1958 was presented to Dr. Rasche. It amounted to $794.07 and Dr. Rasche promptly suggested that it be earmarked for a civic operations fund.

Mayor Frank Zeidler praised Dr. Rasche for his 50 years of effort in the field of education and for his pioneering in the field of vocational education.

During a senior day at Notre Dame High School (a Catholic parochial high school), Dr. Rasche was presented with a "Spirit of Notre Dame" medal. This is an award given annually to a citizen who is outstanding in his efforts and interest in behalf of the youth of Milwaukee.

He has received many other marks of recognition even in prior years. In 1944 he received the Cosmopolitan Club's distinguished service medal, and the Eagles' civic service award was also given to him. In 1957 he received the Wisconsin Hospital Association Award of Merit.

The Vocational School staff honored Dr. Rasche by giving him an appreciation dinner which was attended by approximately 340 school employees and their wives. At this affair they gave him a number of valuable presents among which was a fine movie camera which will stand Dr. Rasche in good stead when he takes the trip to Europe after having finished a number of tasks which he has set himself now that he no longer is held down by the strenuous work of directing the Milwaukee Vocational and Adult School.

His numerous friends in Milwaukee, throughout Wisconsin, and over the entire United States join in wishing him an enjoyable and restful vacation and one and all hope that he will not overload himself with too many of the tasks that he has planned for his future.

William, we all wish you and your excellent wife the best of luck. Don't overtax your strength too much. We want to enjoy your company for years to come.

Sputnik Education and Industrial Arts

MAURICE F. RICHARDS
Associate Professor
Department of Industrial Arts
University of California
Santa Barbara, Calif.

It is doubtful if any scientific achievement of a foreign power has so completely shaken the citizenry of America as has Russia's successful launching of her satellites. The first impact was one of amazement with such thoughts as "Is it really true?" "I thought they were copying us? — stealing our secrets," running rampant. Now, with the realization that Sputnik proves beyond all shadow of doubt that the Russians can produce an intercontinental ballistic missile, the average American is upset and more than a little frightened.

We have been frightened before and in the past the decisive action taken because of our concern has proved to be of inestimable value in the future course of events. Russia's launching of the first satellite could be, for the people of the free world, the most important single event in our time.

Notwithstanding, the United States is running second in a very important race and John Q. Public wants to know why. Every possible reason is being studied and our educational program ranks in importance with the executive and legislative branches of government and our trichotomous military leadership. It is for the electorate to decide if the latter agencies are at fault but the professional educators should be able to measure up to their task and provide the necessary leadership and direction if the former is responsible.

Articles and editorials appearing daily in national magazines and newspapers across the country are analyzing, evaluating, and comparing our educational system with that of Russia. Proposals are being made by people not particularly well equipped to make them and if leaders in education do not assume the responsibility of altering our educational program to fit the requirements of this complex technological and scientific age better, then drastic changes will be foisted upon us which will reflect the temper of our present anxiety rather than a thoroughly planned, honest approach to the problems of this new space age.

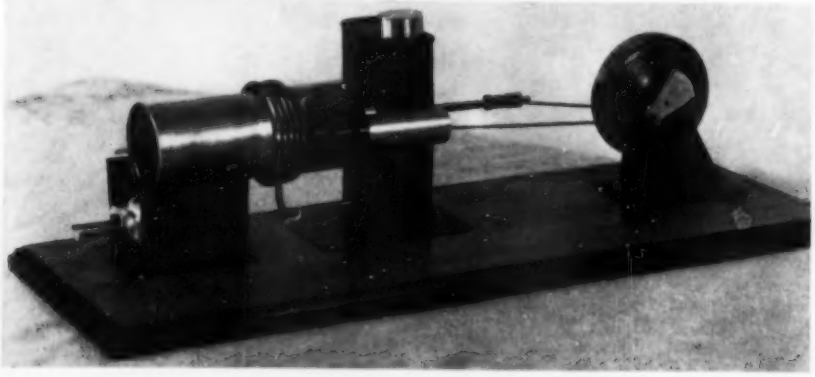


Fig. 1. Air engine engineered, designed, and constructed by Hector Buroker, student, U.C.S.B.C.

Let us objectively face some very simple facts about Russian education, some of which would seem to militate against her scientific successes while others quite obviously aid her.

The Russian educational plan is to specifically educate her students for a most practical purpose. Theirs is the antithesis of a liberal education.

Their ten year primary-secondary curriculum required of those who will qualify for college, consists of 20 units of science and mathematics. This represents about one half of a pupil's total educative effort during these formative years. Hence, the slightest spark of scientific interest is fanned by continual exposure to these disciplines.

The Russian scientist and teacher are accorded a prestige of position and receive financial reward so vastly superior to other fields of work that these professions are the primary objective of almost all students and the attainment of only the most able.

In order that the Russian may keep abreast of foreign developments, the primary-secondary pupil studies one of three foreign languages (English, German, or French) throughout this period and masters the language of his choice before he reaches college age. About 40 per cent of these pupils choose English.

In 1957 Russia claims to have graduated 80,000 scientists and engineers from her colleges. This is three times the number graduated from all U. S. colleges and universities. It is an axiom of large United States industry that for every scientist or engineer employed there must be ten skilled technicians to direct the tradesman who will ultimately convert scientific ideas into products of commercial value.

As we ponder these facts we wonder how a narrow communist indoctrinated mind trained in a stereotyped educational system can produce scientists and engineers whose combined efforts result in scientific progress far in advance of that pursued by the free, liberal, unindoctrinated scientists. Their problems are not simple or concrete or, at times, even practical. Until solved problems of relativity, quantum mechanics and the like are ex-

tremely abstract, require broad vision and vivid imagination, just to produce the spark which ultimately may lead to a solution through the use of the scientific method. How does the slave mind do it? Is it fear of reprisals? Or is it the reward for success? Is it positive, unified direction coupled with long, hard, continuous effort? Or is it rigorous specific education?

If our educational program is even in a small part to blame then we must meet the challenge, alter our educational plan and regain leadership in the field of science. This does not mean that we would adopt the Russian stereotyped program of education, nor does it infer that we should abandon our effort to educate the whole man, generally, socially, and ethically as well as professionally.

We must pursue a course keyed to our times, at least up to the minute and preferably in advance of the present. Indisputably technology, science, and industry are the dominant characteristics of the great world powers today and they have been for several decades.

If the price to preserve our freedom is technological development, scientific skill, and industrial know-how then science and mathematics must be the warp of our educational fabric. At least one or the other should be required continuously from the elementary school through grade fourteen or the second year of college. All other studies should support the program as they now support English, reading, writing, and speech. It is a simple matter for a teacher of English, industrial arts, health, or civics to weave into their courses of study repeated referrals to science and technology in the form of great personalities of science, outstanding scientific events and developments which change the course of history. More effort on the part of all teachers plus continuous required courses in science and mathematics would ferret out all able students who could become scientists and would instill sufficient interest to make them want to be scientists.

The answer to the free world's second rate position in space science is not to be found in vast numbers of scientists but rather in the genius of those able individuals who because they have developed an absorbing interest in science during those formative adolescent years and because they have been challenged by continuous courses in science and mathematics and have gained a thorough knowledge of the practical aspects of our highly technical and scientific world are devoting their lives to science.

How does industrial arts lend itself to the educational theory postulated above? The following definition of industrial arts will identify it as a discipline which could be one of the strongest allies of the new emphasis on science.

> Industrial arts is a study of the dominant factor in our modern civilization — industry; as such, industrial arts is an integral part of modern general education. The industrial-arts student is concerned with tools, materials, and processes; the accumulation and application of information about things technical and mechanical; the understanding and use of principles of design fabrication, processing and production; and the development of skills in the use of hand and machine tools and materials representative of industry in the broadest sense.

Industrial-arts teachers whose course objectives are keyed to this definition of industrial arts would have only minor changes to make to adjust to the new emphasis. Projects undertaken would have to embody scientific principles. The information disseminated and the skills achieved would be essentially the same; however, the effect on the budding scientist would be to intensify his interest in science to teach him how to experiment and test scientific principles. The able student developing an interest in science would find no other laboratory so well equipped to assist him in the development and construction of projects in his chosen field.

The project shown in Figure 1 is just one example of an unlimited number of projects embodying scientific principles which would create an absorbing interest in the junior scientist.

Present this to a high school class in industrial arts and watch the eyes of the able students with a bent toward science *light up* when you tell them this is an *air* engine. That's right! It runs on air and an external source of heat. Probably you could make it work on solar heat. This one has a small electric coil as a heat source. It cruises at 800 r.p.m. Shall we test to find out the torque? The horsepower? Shall we try a different source of heat? Would you like to make one — just a flywheel and a couple tin cans. Let's do some planning and figuring first.

Problems and Projects

PRIZE WINNING MICROMETERS

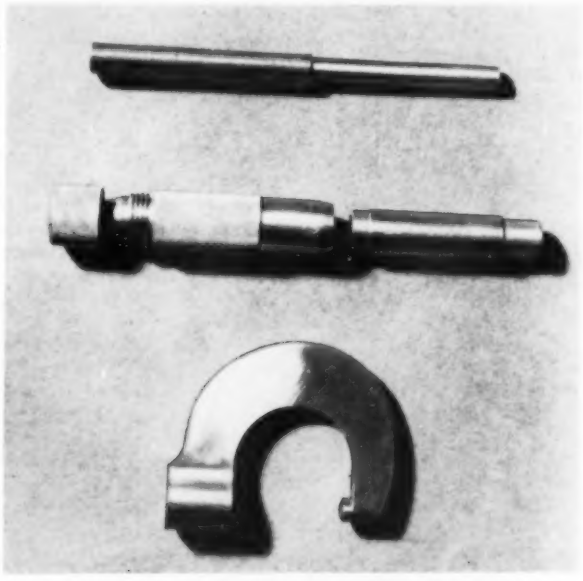
JOHN KLUZ
Metal Shop Instructor
Reavis High School
Oak Lawn, Ill.

When I first heard about the Student Project Fair to be held on April 18 and 19, 1958, by the Industrial Arts Club at Northern Illinois University, DeKalb, I encouraged my students to enter projects which they were working on. I thought it would be good experience for them, and of course, I hoped that some of the projects would win prizes.

We were very pleased with the results, and also by the interest shown in two of our projects. Both of these projects were micrometers. A 1-in. outside micrometer, made by Ray Kazmierowicz, won first place in the senior machine metals division, and a depth micrometer, made by Bob Tischer, won fourth place in the same division.

1-in. outside micrometer. First place senior machine metals division, Northern Illinois Student Project Fair, DeKalb, Ill., April 18–19, 1958

The boys had had to talk me into letting them make the mircometers. I tried to explain to them the problems that



Parts of 1-in. outside micrometer before assembly

— Pictures by Bob Pugh, student photographer

would be encountered in making a micrometer in an industrial-arts shop. I did not lack confidence in the boys' ability but it often happens that a boy starts a project with a great deal of enthusiasm and then gets discouraged when he runs into trouble. I was afraid this would happen to the boys attempting to make the micrometers. Finally, however, I gave my permission for the micrometers because the boys were so persistent. I'm glad they were.

Most of the design was taken from the Starrett and Lufkin *mikes* used in the school shop. We modified dimensions of the standard micrometers to suit the tools and equipment we had in our shop. Most of the time the boys worked from sketches which we made as we went along. A 40-pitch tap is rather expensive but we were fortunate to have the father of one of my students make two $\frac{5}{16}$ in.-40 taps for us at no cost to the school. Neither the school nor the boys bought anything. The tools used were the standard tools and machines used in any machine shop.

Here is the general procedure we used in making the *mikes*. The frame was made from a piece of $\frac{3}{4}$-in. thick mild steel. The frame was shaped on the milling machine and surface grinder. The space between the anvil and hub was milled out with a woodruff key cutter. The frame was milled on a dividing head while being held against an angle plate. The hole for the hub and anvil was drilled and reamed at this time. If we were to do it again we would make the frame from a good stainless steel or high chromium steel.

The hub was made from $\frac{7}{16}$-in. diameter drill rod. Graduations were milled in with on old end mill ground to the shape of a threading tool. Distance between graduations was obtained by raising the table of the Bridgeport Vertical Mill .025 in. for each cut. A dividing head was used to revolve the hub for the graduations. The hub was pressed into the frame.

The sleeve, made from toolsteel, was knurled and turned on the lathe, and again the .001 in. graduations around the sleeve were milled by using the dividing head. The inside end of the sleeve was tapped with the $\frac{5}{16}$ in.-40 tap for the spindle. The outside right end of the sleeve was threaded $\frac{1}{2}$ in.-20 (the finest pitch we had) for the cap and split with a circular cutter to act as a collet. The cap served to clamp the sleeve to the spindle and when loosened the spindle could be adjusted.

The anvil was hardened and tempered and pressed into the frame. The numerals on the hub (each .100 division) were stamped in with the aid of a simple jig with $\frac{1}{16}$ in. high standard stamps. The numerals in the sleeve were stamped in by eye with $\frac{1}{32}$ in. high standard stamps.

The procedure used in making the depth micrometer was similar to that used in making the 1 in. outside micrometer. We made only minor changes to allow for the differences in construction.

The boys' success in making the micrometers was a great satisfaction to me but a greater satisfaction was their attitude, which is exemplified by this remark made by one of the boys when the micrometers were about half finished: "Even if I don't finish it, I learned more and had more fun making this than all the other things I worked on."

The first prize award in the Senior Machine Metals Division was a Starrett 1 in. micrometer.

GRADING DRAFTING ROOM STUDENTS

JOHN E. HAWSE
Drafting Teacher
Wildwood, Ill.

Much has been written on the subject of grading. Unfortunately, most of what one reads deals with vague generalities about the objectives of a program, individual differences, and even the much abused *I.Q.* This is all very fine until one has to actually sit down and figure out a method of evaluation that is both fair to the student and practical for the teacher.

In my search for a workable method for grading students of drafting, I have studied many different systems from the extreme of "just give a letter grade and forget it" to a complicated system of charts and curves and tables which may have been fair to the student but make it mighty rough for the teacher.

The following system is one I have worked out and it has done the job very well for me. I offer it for the benefit of others who might like to try it. A rubber stamp was made of the plate evaluation table, and it is stamped on each drawing plate. The following information is duplicated and a copy given to each student:

Plate Evaluation

The following information will apply to the evaluation of drafting plates in this course:

PLATE EVALUATION

Solution	25
Dimensioning	25
Neatness	10
Lettering	10
Views	10
Line Quality	10
Title Strip	10
Total points	
Late; —5 points/day	
Grade: *Total points*	

Each plate will be evaluated on 8 categories. A total of 100 points may be earned. Each category on the plate evaluation table shows the total number of points that can be earned if there are no errors in that area of your work. In the blank space will be entered the number of points you have earned.

1. Solution — 25 points.
   This category covers drawing the plate correctly and to scale, showing everything that is necessary to fully describe the object. 5 points will be deducted for each of the following:
   a) Line omitted.
   b) Line that does not belong.
   c) Surface incorrectly measured or laid out.
2. Dimensioning — 25 points.

This covers the correct placement of dimensions and sufficient dimensions to completely describe the object. Five points will be deducted for each of the following:

a) Omitted dimension.
b) Misplaced dimension.
c) Superfluous dimension.

3. Neatness — 10 points.
   This covers the cleanliness and neatness of the plate.
4. Lettering — 10 points.
   This covers the quality of lettering as to style, size, and shape.
5. Views — 10 points.
   This covers the correct selection of views as well as the placement of views on the plate.
6. Line quality — 10 points.
   This covers the correct use of pencils to get the right contrast between lines, and also the correct width of lines when inking.
7. Title strip — 10 points.
   This includes not only the title strip itself, but also any notes, tables, parts list, or bill of materials as may be necessary.
8. Late — minus 5 points per day.
   Any plate that is not in on time will have five points deducted from the total points earned for each day it is late.

The following table shows the breakdown of points used to determine letter and number grades.

Total Points Earned	*Letter Grade*	*Number Grade*
95–100	A	8
90–94	A—	7
85–89	B	6
80–84	B—	5
75–79	C	4
70–74	C—	3
65–69	D	2
60–64	D—	1
below 60	X	0
incomplete	Inc.	

For the purpose of figuring grade averages, the number grade is recorded in the grade book instead of the letter grade.

NAVAJO SQUAW BOOTS

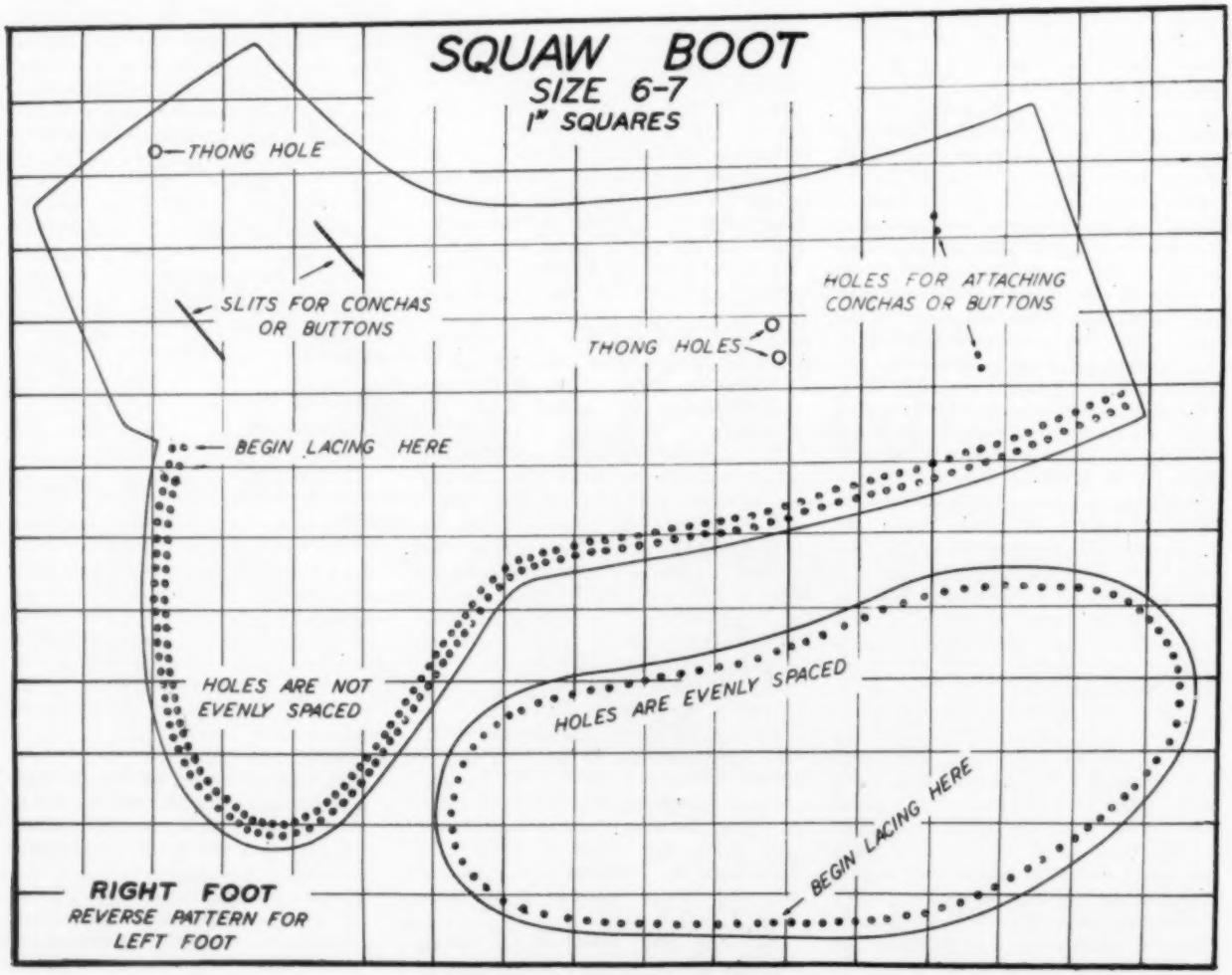
JAMES O. APLAN
Graduate Assistant, Industrial Arts
Sul Ross State College
Alpine, Tex.

In keeping with the present popularity in Western wear, one of the most popular projects in leatherwork is moccasin making.

A favorite type of moccasin is the squaw boot, authentic footwear of the Navajo Indians.

The top parts of the boots are made from soft, colored cowhide such as *moccasin cow*, which looks well, smooth or rough side out. The soles are usually made of the same material but of a contrasting color, smooth side out for cleansing, with an inner sole cemented in to give support.

Laying out, cutting, punching the holes, and lacing operations are quite simple and the beginner soon becomes quite proficient. Rolled leather buttons or metal conchas add a decorative touch and the boots may be further enriched by beadwork as those pictured here.



Detailed pattern for making the squaw boot

A group of squaw boots made by Sul Ross students

The finished pair of squaw boots

Note the matching drawstring pouch

The holes purposely come together at the toe on the top piece while the holes in the sole are evenly spaced all around. It is very important that the lacing is started at the holes indicated by the arrows on the pattern.

A whipstitch is used in lacing the boots with a No. 6 or 7 Barbours waxed thread. Starting from the underside, lace through the lower starting hole in the top, then through the starting hole in the sole. Now go over the edge of the sole to the next upper hole in the top. Continue until completely laced all around, end the job by going through the upper hole over the starting hole and tie the ends together in a tight knot.

Upon finishing the lacing operation the squaw boot may appear to be considerably out of shape. By dampening the leather slightly, the boot is easily shaped on the foot of the wearer.

Contrary to popular belief, genuine Indian moccasins are never loose fitting. The purpose of the thong is to tie the flap down and enable the boots to be tightened, giving a snug, form-fitted look.

The size 6–7 pattern may be enlarged or made smaller by the addition or subtraction of ½ in. to the lower edge of the top and all around the edge of the sole for each full size. For half sizes use the next smaller size, dampen the leather and stretch to fit the foot.

ABILITY MARKING SIMPLIFIED

LAWRENCE THEMMES
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Johnson High School
St. Paul, Minn.

If you are an industrial-arts teacher employed in a school where ability marking is of prime importance, then you have experienced the dilemma of trying to justify the marks you give. Unlike marking on a curve with absolute divisions between A, B, C, D, and F, ability marking has no definite lines between O (outstanding progress), S (satisfactory progress), and U (unsatisfactory progress). Since marking a student's progress in relationship to his own ability to achieve can only be an estimate, it may or may not be an accurate one.

A practical solution to this perplexing problem is to use a marking chart such as the one illustrated in this article. One function of the marking chart is to convert per cent scores on oral or written reports and tests to an O, S, or U. The point of intersection between the I.Q. line and per cent line determines the progress score a student has earned. The marking chart is quite accurate and any discrepancy encountered with its use can usually be traced to

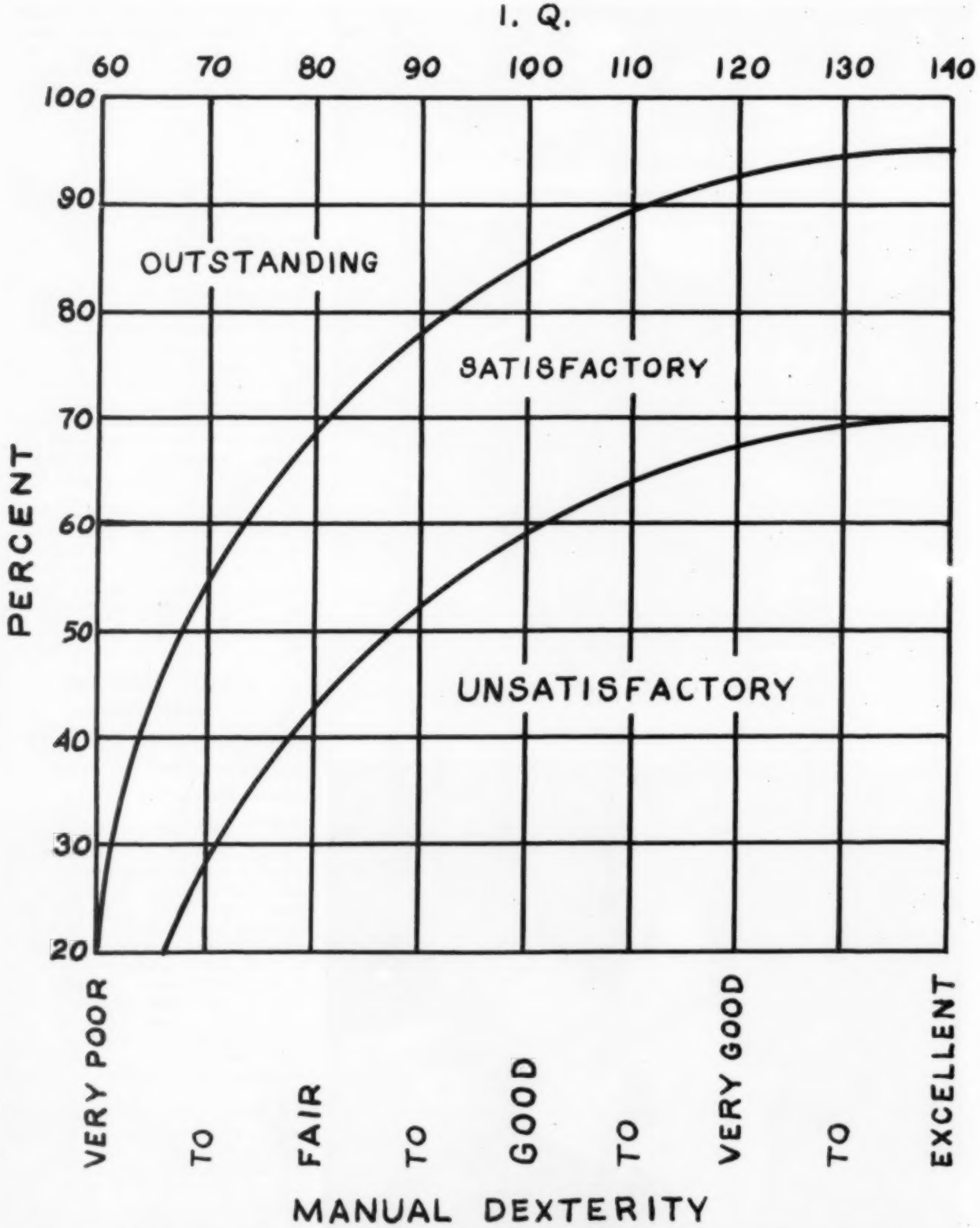


Fig. 1. Ability marking chart for converting per cent scores on both mental and manipulative exercises to either outstanding progress, satisfactory progress, or unsatisfactory progress in relationship to each student's own ability to achieve

ABILITY MARKING CHART

a faulty I.Q. score. Retesting the student in question should eliminate this discrepancy.

The second function of the marking chart is to convert per cent scores on manipulative operations, project workmanship, and performance tests to an O, S, or U. To utilize the marking chart for this purpose, you must first observe each student at work in the shop and classify each into one of the categories listed under manual dexterity. Once each student has been initially classified, the marking chart is used in the same way as with the I.Q. score.

The marking chart was developed on the theory that a bright student must attain at least 95 per cent before his progress can be considered outstanding, and he must attain at least 70 per cent to avoid having his progress listed as unsatisfactory. Any score between 70 and 95 per cent is considered satisfactory. The arcs maintain a 25 point span as they curve downward to compensate for lower I.Q.'s. This gives each student the same chance to earn an O according to his own ability.

One technique that I have used to good advantage is to write two sets of numbers after each name in the class record book. The first set of numbers is derived from the intersections of the two arcs with the corresponding I.Q. line for each student. A boy with an I.Q. of 102 would have 60–85 after his name indicating that any score under 60 per cent is unsatisfactory; any score over 85 per cent is outstanding. This same procedure is followed in writing the second set of numbers which are derived from the intersections of the arcs with the corresponding manual dexterity line for each student. Once the numbers are recorded after all the names in the class record book, the marking chart may be filed as it is no longer needed. Any future marks to be entered in the class record book can be immediately converted to O, S, or U by merely glancing at the numbers opposite the student's name. This is Ability Marking Simplified.

LAPIDARY — A HOBBY OR A VOCATION

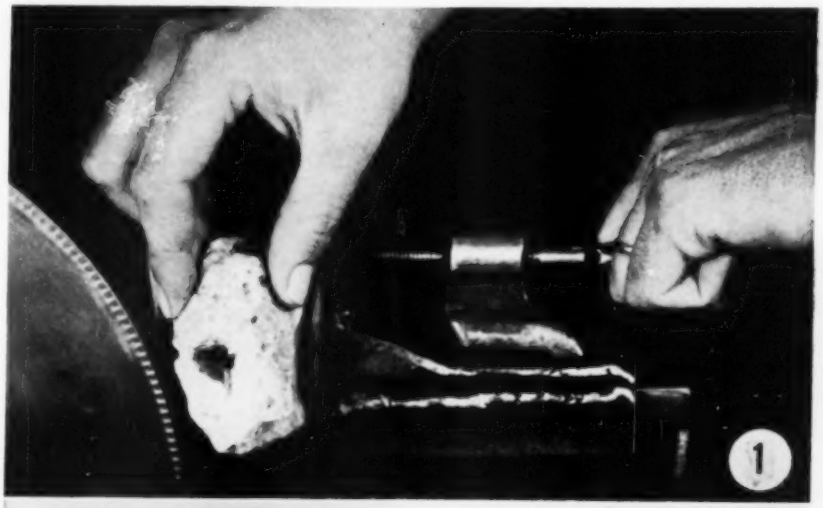
CHAS. M. HUNTER

Alpine, Tex.

Lapidary is a fascinating hobby, and a craft that is rapidly becoming an art. This course is being added to the curriculum of a great number of high schools throughout the nation.

The gathering, cutting, and polishing of semiprecious stones is not only a hobby, but large numbers of people are going into this work professionally. There are supply houses in most major cities which have devoted their facilities to the sale of equipment and supplies for the lapidarist.

These photographs will illustrate the



— Photographs by Hunter's, Alpine, Texas

step-by-step procedure used in the working of gem quality stones and the fabrication of a suitable finding.

A fascinating part of lapidary work, to the beginner, is slab sawing. See Figure 1. Each stone offers a challenge to the individual since the inner qualities are not revealed by surface characteristics. Many rough stones are usually cut before the craftsman discovers the particular pattern desired.

As rough stones are found in various shapes and sizes, extreme caution should be used in securing the stone in the clamp. Take great care not to damage the diamond saw blade, nor to lose a valuable stone.

When the slab has been cut, selection of the shape for the stone depends to some degree upon the artistic sense and eye of the workman.

There are several points to be considered before scoring the stone. These are namely: What is the size desired? Is the finding to be made by the workman or purchased ready-made? Is the stone of sufficient value to merit mounting in an expensive finding? These are the questions that should be taken into consideration before the lapidarist should score the slab. There are many templates available, or if desired, one could be made from plastic sheet stock. See Figure 2.

Figure 3 shows the results obtained in scoring this particular type stone with an aluminum wire needle sharp. Brass wire may be substituted for the scoring if desired.

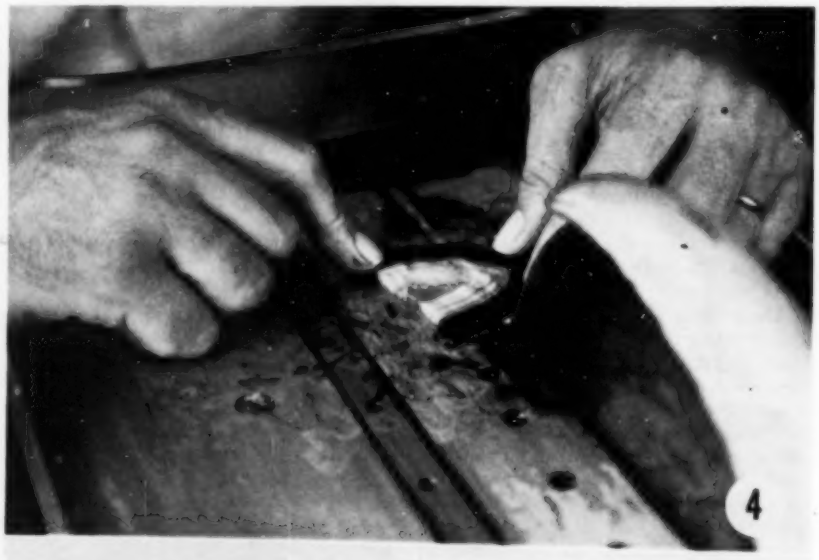
The trim saw, if properly used, can save the workman valuable time in shaping the stone. See Figure 4. Caution should be taken in the trimming of the stone to the marked line. Enough space should be allowed for the removal of the saw marks in the grinding process.

An important phase of lapidary is dopping. Figure 5 shows how dopping is done. When the grinding process begins, the stone is not smooth, and if the bond of the wax between the dop stick and the stone is loosened the stone may be thrown against the floor or some other object and broken.

Important points in the grinding of semi-precious stones include: a true grinding stone, a constant flow of water on the grinding surface, the frequent checking of the stone in the opening selected on the template. Figure 6 shows how the grinding is done. Work must be ground to a close tolerance, yet enough margin must be allowed for the final grinding and polishing.

The drum sander is used after the grinding wheel. By this process the marks left by the grinding wheel are removed and the proper shaping of the stone is complete. See Figure 7.

The last step in the grinding of a stone is generally done on silican carbide wet and dry disks of 400 and 600 grit. Here all scratches are removed and the stone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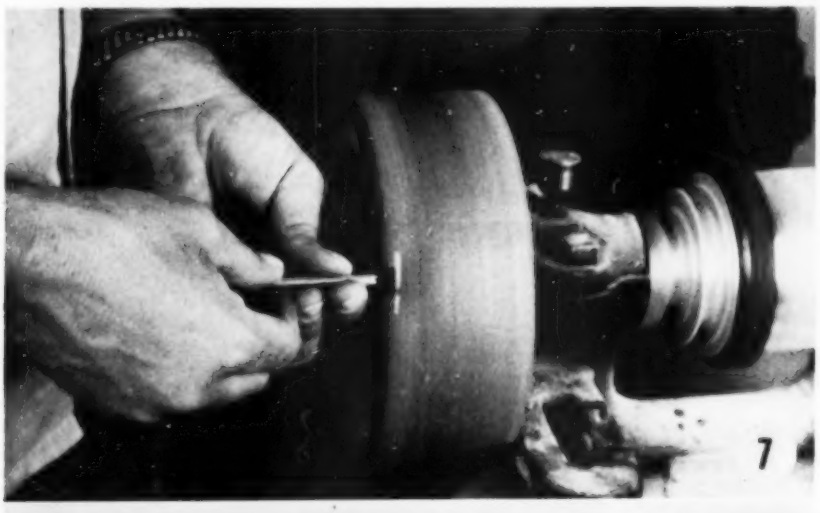
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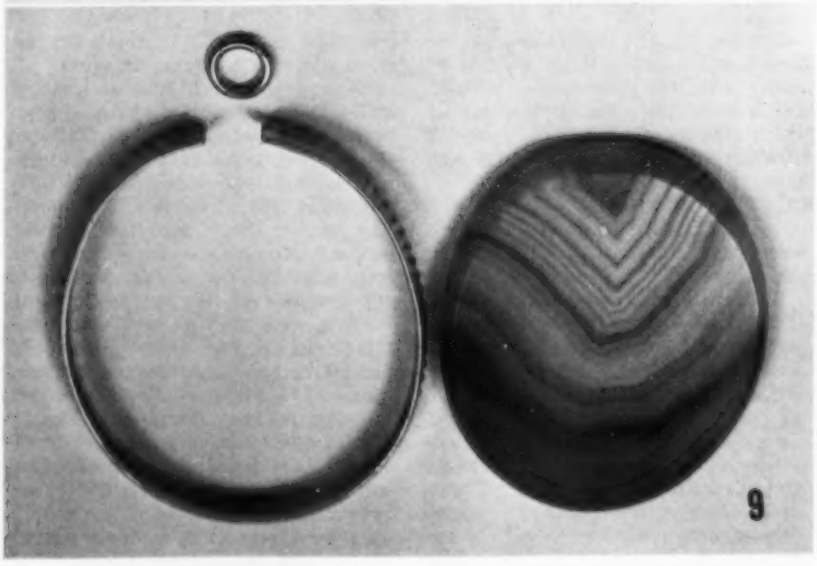
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is worked until it attains a polish finish. A disk, previously worn smooth in the grinding process, should be employed for the final step.

A few light strokes of the stone on the polishing wheel will give the desired results if all scratches and pits have been previously removed.

When the polishing of the stone is completed the stone can be removed from the dop stick and cleaned. The stone is then ready for mounting.

In this particular project the finding was made from bezel wire of sterling silver. See Figure 9. Findings may be purchased if desired.

A metal C clamp, a fire brick, welding torch with a No. 3/0 tip, and solder are necessary for the making of a suitable finding. See Figure 10.

Figure 11 represents the workmanship, ideas, and the artistic ability of the lapidarist. The beauty of the finished article compensates the individual for the efforts put forth. See Figures 10 and 11, p. 222.

THE TEACHING OF TECHNICAL DRAFTING

MAURICE MALOFF
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Chicago, Ill.

Great strides have been made in the science of teaching during the past 25 years. The impact of the philosophy of education, the psychology of learning, and child development have greatly altered the class teacher's approach. It is generally believed and accepted that understanding in the teaching of technical drafting, as well as any other phase of the curriculum, should be one of the class teacher's objectives.

Why is understanding so important? Well, if we as teachers realize that technical drafting or mechanical drawing, as the study may still be identified, is the language of industry and its chief means of communication, one can see the conclusions readily. The technical characteristics and symbols related to the subject must be familiar to the students if they are to properly experience their use. What is involved when you tell your class, "Place the center of the one-inch circle at the intersection of the horizontal and vertical centerlines"? The pupil must know several basic facts to fully understand. He must know measurement of circles, vocabulary, alphabet of lines, and the techniques of the drafting pencil. He must be proficient in the use of his drafting equipment to the point where its use would not interfere with his interpreting the problem.

See Figs. 1 to 9 on pages 219, 220, and 221

In the past the usual method of instruction would rely heavily upon drill. The student started to draw by beginning with a simple project and continuing with each succeeding problem increasing in difficulty. Each symbol, fact, or technique encountered would thus be repeated many times and it was hoped that by this method content would be learned.

Another method of teaching drafting, which is being used to a greater degree today, is the one where understanding, motivation, and exploration based upon educative judgment precedes assignment of the problem.

When considering the individual it is easy to see that each student makes his own adjustment to the work at hand. The assignment, whether it is given orally or graphically, must make sense to the student. Consideration of the ability and background in subject matter of the pupils should be in mind of the teacher when assignments are prepared. The project must allow for the student to discover with satisfaction the representation of the various views. The superiority of drawing lines correctly should be amplified by experiences encountered. Considering these basic factors will, for many of the pupils, assure success which it is so important for them to taste.

Our major concern as drafting teachers is not to make duplicators, but to teach students to have the understanding of each problem and to interpret it so that it is intelligible to industry, thereby representing the problem in the correct standardized form.

Technical drafting is not purely mechanical. It is interpreted largely by a person's perception and understanding of what he is drawing. These factors are in turn controlled by the individual's mental attitude. A positive attitude must be included in the make-up of every project undertaken. Some people may refer to this as motivation. Whether the problem has "built in" motivation or whether motivation occurs through the dynamics of the instructor the aspirations of the students must be the driving force which brings home every objective.

Motivation, aspirations, or interest is an attitude which must be nurtured if we as teachers can achieve any lasting influence. We must rely on these factors to carry the student over the educational lag until he can function with understanding and purpose.

Ingenuity and resourcefulness are important ingredients which result from understanding. The student can exercise these creative factors to the limit of his ability when the project is understood. Needless to say, the atmosphere in which the student works must be friendly, sympathetic, and firm. Perhaps the room organization can contribute to these factors. Certainly wide reference materials, group discussion, demonstrations, and individual projects can help.

The main emphasis of any program of technical drafting cannot be on sheer performance. An essential point is to generate and foster aspiration, attitude, and a desire to understand. In presenting our work in a way that young people will achieve understanding the teacher may allow the students to select their projects from a large variety of problems. What would they like to draw? The student's choice should be respected. We may ask the student for a preliminary sketch of the problem or talk things over to help formulate a working plan. As the student starts to work difficulties may be encountered. To find the answer to what, how, and why is the next logical step. At this place the approach to each individual will take a different path. Several students having similar problems can plan together and figure things out with the teacher acting as general organizer or guide.

As teachers we should think of skill as a refinement of understandings and aspirations. It grows out of free and ample experience in problems undertaken. The student should have opportunities to use his drafting instruments without concern for definitive results but a good deal of concern for the possibility of some kind of interesting and rewarding success. Tactful hints may be given whenever the occasion arises.

As in every other kind of teaching and also in technical drafting, evaluation is a vital consideration. The key to good evaluation is always the continuous and increasingly mature self-evaluation and guidance of the pupil. The teacher should not stand off and form his own opinions, but should make it possible for the learner himself to appraise his own successes and failures. When a pupil is trying to achieve something specific and understandable he himself can tell how he is doing and discover impediments. Evaluation proceeds on definite criteria arrived at by a joint discussion of pupils and teachers; it should not be the professional secret of the teacher. To understand better the establishment of the criteria as a joint venture is certainly part of the learning and growing process.

FLYING DUCK

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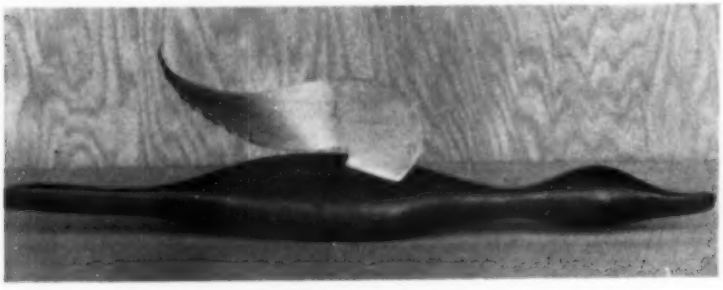
Industrial Arts Dept.
Hoover Elementary School
Redwood City, Calif.

An interesting wall piece can be carved from 1½ in. thick mahogany. Simple tools are required. Develop the pattern from the drawing. The cutting can be done either with a band saw or a jig saw. Form the duck's body using a wood rasp. Once rough shaping is completed, finish the blending with a finer file. Next sandpaper to fine finish.

Finally use a varnish or lacquer finish. Unusual effects can be achieved by using commercial spray cans, obtainable in many colors.

The wing is made of thin sheet aluminum. Once the duck has attained its desired appearance, attach the wing using small wood screws.



The flying duck

TWIN PICTURE FRAME

HERBERT NOLD
Euclid, Ohio

Machine shop students are always looking for practical and useful projects. Here is a project that incorporates many lathe operations and also serves a useful purpose.

To make the twin picture frame, the following tools or equipment are needed: a rule, 1- and 2-in. micrometers, an outside caliper, an inside caliper, boring bar, knurling tool, $^{5}/_{16}$-in. drill, No. 29 drill, $^{3}/_{8}$-in. tap.

Materials needed: 1 piece of ½ by 5-in. aluminum round bar; 2 by 1-in. aluminum round bar; 2 — 2 by $^{3}/_{8}$-in. round aluminum; 1 — $^{1}/_{8}$ by $^{7}/_{8}$-in. aluminum pin; 2 — $^{1}/_{16}$ by 1¾-in. plastic for lens; 2 — 4-in. spring wire; 2 — 1¾-in. cardboard to back picture.

The step-by-step procedure follows:

1. Face the ½ by 5-in. stock to length by chucking it in a universal lathe chuck. Cut $^{3}/_{8}$ by ¾-in. shoulder and round off opposite end in universal lathe chuck. Cut or chase $^{3}/_{8}$ — 16 N.C. threads. Locate and drill No. 29 hole per drawing.

2. Face the 2 by 1-in. stock to length by chucking it in a universal lathe chuck. Bore $^{5}/_{16}$-in. hole using Jacobs chuck in tail stock.

3. Turn faced piece between centers using mandrel. Shape per drawing. Knurl desired pattern. Tap $^{3}/_{8}$ — 16 N.C. threads.

4. Face 2⅜ by 2-in. stock to correct thickness. Turn ⅛-in. radius on one side of each piece. Bore large hole not larger than $1^{9}/_{16}$ in. Use boring bar to enlarge hole to $1^{9}/_{16}$ in. With boring bar make $1^{13}/_{16}$-in. hole ¼ in. deep opposite ⅛-in. outside radius. Cut $1^{7}/_{8}$-in. diameter inside per drawing. With No. 29 drill make holes for connecting pin.

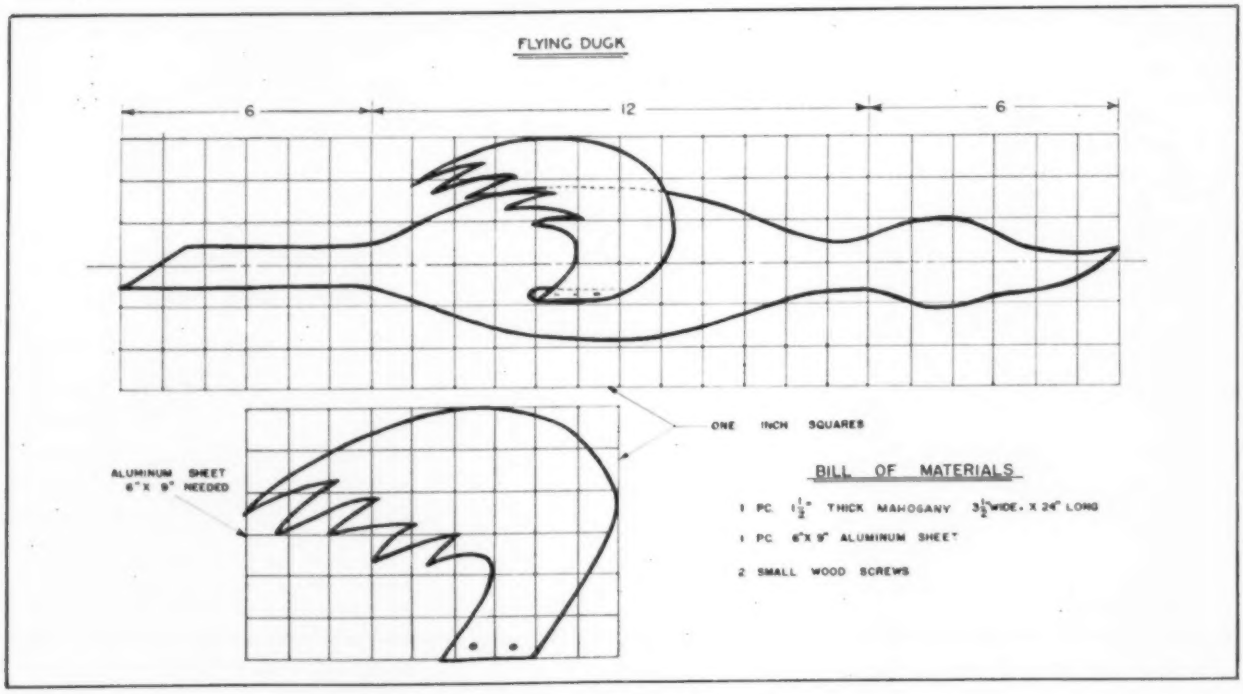
5. Screw base and cutter post together.

6. Cut two ⅛-in. plastic for lens.

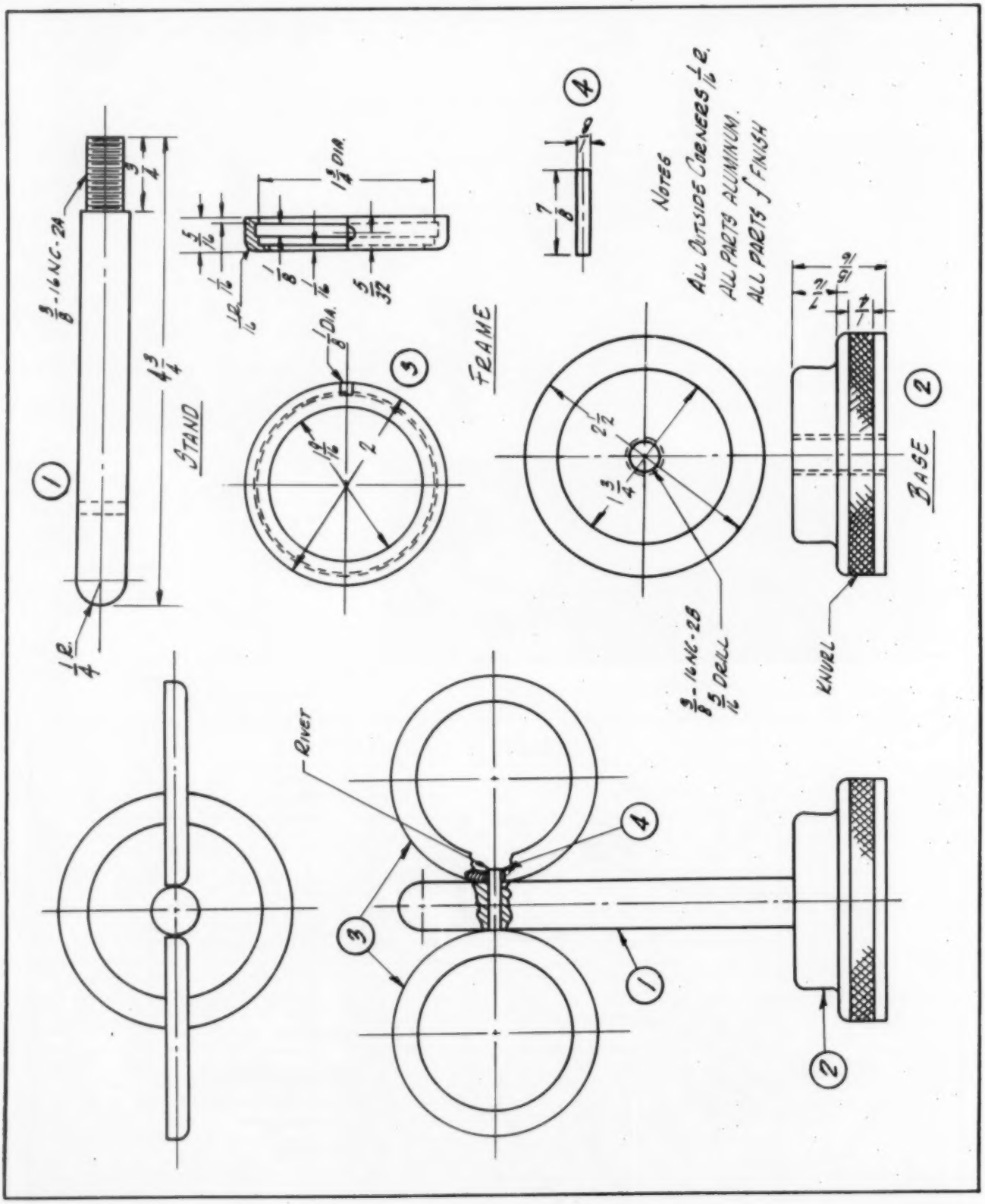
7. Cut pictures to be mounted to fit frames.

BILL OF MATERIALS

No. of Part	*Name*	*Material*	*No. Required*
1	Stand	Aluminum	1
2	Base	Aluminum	1
3	Picture frame	Aluminum	2
4	Connecting bar		1
5	Spring wire, No. 40 gauge		2
6	Glass, ⅛ by $1^{5}/_{8}$ in. dia.	Glass or plastic	



Detail drawing of the flying duck



Details of the twin picture frame

Twin picture frame

A lumber support for the circular saw

8. Cut cardboard backing to fit.

9. Cut two 4-in. spring wire clips and snap in place behind picture and cardboard.

The picture frame, besides being pretty, serves a useful purpose. The operations that are learned are many. Facing, drilling on a lathe, turning between centers on a mandrel, knurling, tapping threads, internal boring, chasing threads on a lathe or cutting threads with a die. The project can be made out of cold rolled steel, brass, aluminum, etc.

A LUMBER SUPPORT FOR THE CIRCULAR SAW

RUSSELL D. OSTERHOUT
Monte Vista School
Phoenix, Ariz.

To handle large stock on a circular frequently requires a support. The support illustrated can be used when either ripping or cutting off long stock. The illustration shows the top turned for use as an accessory in cutting off stock. On this support the rollers are made from surplus bearings, but any small wheel or roller could be used. To convert the support for use in ripping, the top section is pivoted, putting the long roller on top. The height is adjustable for use with the jointer or other power tools.

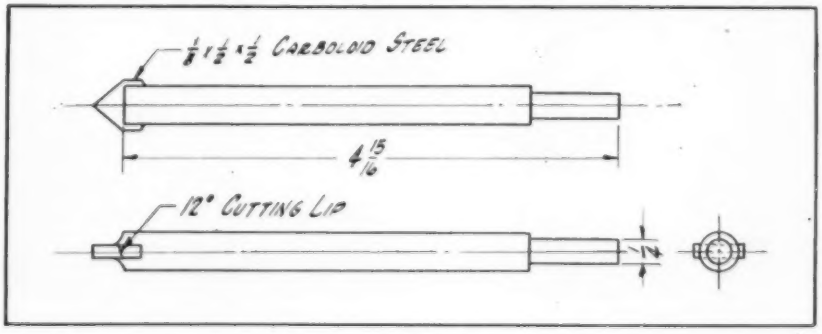
DRILLING HOLES IN GLASSWARE

C. G. COOPER
Mason Junior High School
Erie, Mich.

After several unsuccessful attempts at drilling holes in glassware with carborundum dust and a piece of brass tubing, into which teeth had been filed, or drilling such a hole with a ground triangular file, we found success with a ⅛ by ½ by ½-in. piece of carboloid steel that was ground to a 12-deg. cutting lip, and brazed to a ¼-in. mild steel rod.

Before placing the cutter into the hand drill, it is tapped lightly with a ball-peen hammer over the selected spot for the hole. This tends to give a better bite and prevents the cutter from creeping. The cutter is then placed in the hand drill, and using a light pressure and turpentine as a lubricant, the hole is formed up to a half inch in diameter, or so that a ⅛-in. nipple can be placed into the bottom of the socket and through the hole.

Pouring flat black paint into the bottle previous to drilling will give it a crazed effect after drying, and then gold or silver paint is poured into the bottle which gives a sprackle finish. White beach sand or commercial sand can be poured into the bottle in alternate layers, to give it a pleasing appearance.



Glass drill

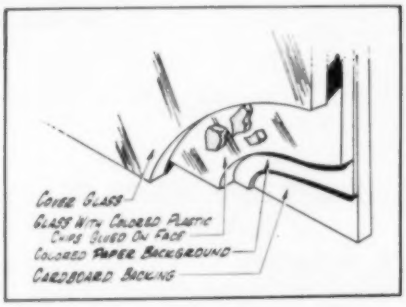
Glass lamp bases by C. G. Cooper

PLASTIC CHIP MOSAIC

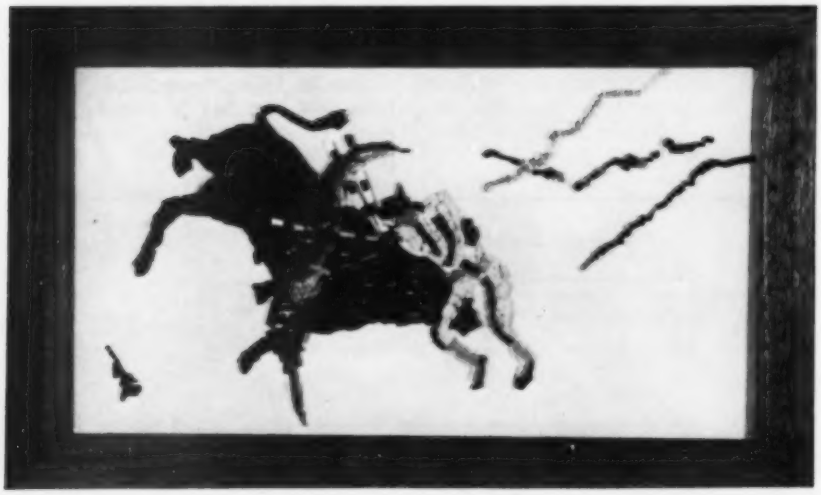
LYNN MICKELSON, JR.
Teacher of Industrial Arts
Ballard High School
Seattle, Wash.

A common problem confronting an industrial arts teacher today is how to best utilize "waste" or "scrap" materials around the shop. Discarded pieces of common "waste" materials in a crafts class are utilized in this interesting mosaic picture.

The discarded bits of colored plastic around the shop are first collected and cut down to handy sized chips of about one-quarter inch square. Next, a general design or picture is drawn, and a sheet of glass is placed over the drawing. The plastic chips are then glued directly to the glass with ordinary household cement according to the design of the drawing beneath the glass. When the chips have dried, the glass may be inserted in a frame with a cover glass to keep dust off. A backing paper of a suitable neutral color to highlight the mosaic can then be added.



Detailed directions for making the mosaic



Plastic chip mosaic

— Photograph by Whitie Marten

BELT-BUCKLE RING

A. C. VASIS, JR.
Chicago Teachers College
Sabin Campus
Chicago, Ill.
and
RICHARD E. SOLEM
Cicero Public Schools
Cicero, Ill.

The belt-buckle ring is a project that has been made by students in the ungraded divisions of the elementary school, high school, and college. It is a project well suited for metal, art metal, craft, and art classes. Students of all ages enjoy making this project because of its attractiveness and the interesting operations which are involved in making it. A sample of this project as well as the cut shown in Figure 1 may serve to stimulate interest in, and a better understanding of, and appreciation for the belt-buckle ring. The job sheet for the belt-buckle ring follows:

BILL OF MATERIAL

1 pc. of stainless steel (20-gauge) $\frac{3}{4}$ by $2\frac{3}{4}$ in.

Tools

Scale, scriber, tin snips, center punch, ball-peen hammer, flat file, jeweler's files, hand drill, $\frac{3}{16}$-in. drill bit, $\frac{1}{16}$-in. drill bit, and file card

Supplies

Emery cloth, steel wool, jeweler's rouge

Equipment

Buffer, soldering kit, Bunsen burner, forming jig

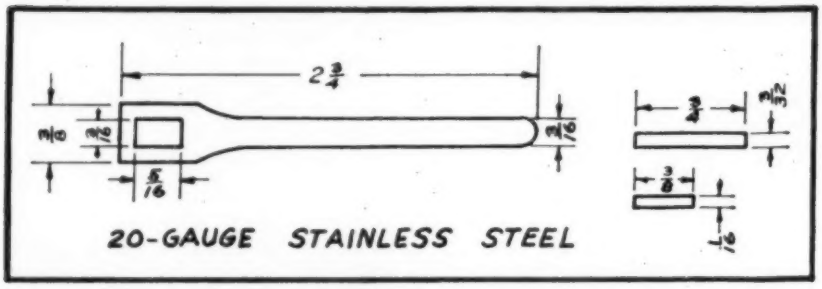
Procedure

1. Select stock.
2. Lay out stock.
3. Cut out stock with tin snips.
4. File edges to size.
5. Drill all holes.
6. File buckle hole to size.
7. Emery cloth all edges.
8. Steel wool all surfaces.
9. Buff all surfaces to a high luster.
10. Bend pieces of metal to shape.
11. Solder parts together.
12. Rebuff.

Job must be checked by instructor before going on to the next job.

Safety Rules

1. Always use a file with a handle.
2. Be careful when using scriber.



Detail drawing of the belt-buckle ring

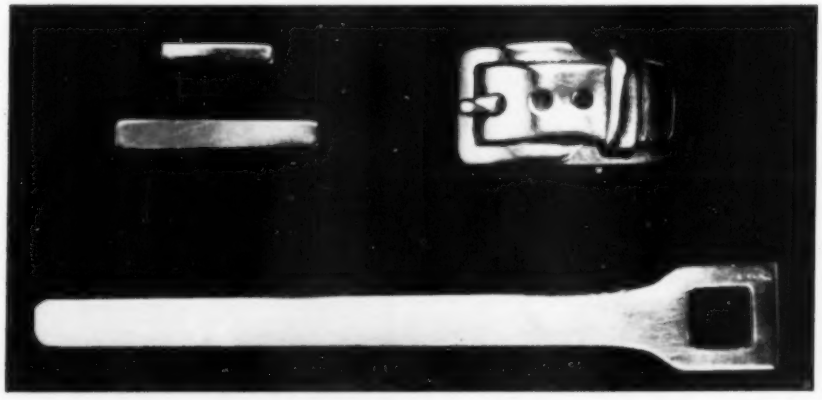


Fig. 2. The belt-buckle ring and its parts

Fig. 1. The belt-buckle ring

3. Beware of sharp edges on metal.
4. Make sure that you understand how to use the soldering kit (check with instructor).
5. Hold ring *under* the buffing wheel when buffing (not on top of the wheel).
6. Place ring around forming jig (dowel rod) when buffing.

Analysis of Project

1. How to select stock.
2. How to lay out stock.
3. How to scribe a line.
4. How to cut out stock.
5. How to measure with a scale.
6. How to finish edges with a file.
7. How to clean a file with a file card.
8. How to finish edges with emery cloth.
9. How to finish edges with steel wool.
10. How to bend metal to shape.
11. How to drill holes in metal.
12. How to apply soldering flux.
13. How to apply solder.
14. How to sweat solder with a Bunsen burner.
15. How to apply jeweler's rouge to buffing wheel.
16. How to buff metal.
17. How to use a forming jig.
18. How to clean buffing wheel.

Very little material is needed to make this project. Shops with a limited budget and a shortage of tools will find this project ideal. This project may be redesigned and many more operations may be added. A slit in the ring would convert it into an earring. If cuff links or a tie bar is desired, the buckle part of the ring can be easily soldered to findings. In fact pins and necklaces can be made to match.

Figure 2 shows the completed ring as well as the parts that go into its making. The complete ring can be made from a piece of 20-gauge stainless steel 3/8 by 2 3/4 in. Monel metal may be substituted for stainless steel. A 2 3/4 by 10-in. piece of stainless steel would be more than enough for a class of 26 students.

This project is inexpensive and its construction can be simple or complex depending on the level of the students.

MODERN LAMP

BOB REEVES
Chula Vista, Calif.

The modern lamp described here will provide your students with a lot of incentive for metal spinning. All too often the students involved in metal spinning tire of making the usual trays and bowls because they are so similar. By combining metal spinning with other metalworking experiences in the construction of an attractive and useful lamp you have a fine combination of student learning and student interest.

Inasmuch as the spun section is pretty much the center of the lamp let's begin construction by spinning a soft brass or copper disk to the shape indicated in the drawing. An aluminum disk would be cheaper and easier to spin, but it does not provide the necessary base for soldering to the adjoining parts. Since you will eventually paint over the spun surface do not polish it to a high gloss, but, instead, provide a satin finish with emery cloth.

The next step is to place the light socket in the center of the spun section to mark the hole locations for the screws which fasten the socket and the wiring from the switch in place. Drill the holes but do not fasten on the socket as yet.

Make the brass ring from 22-gauge soft brass. Lay out the top design and drill the small holes before shaping the top edge. Form into a complete circle and solder the lap joint on the inside where it doesn't show.

The bottom ring can be made of any sheet metal which is readily soldered and painted. A thickness, of 22 to 24 gauge would be best. Locate and drill the necessary holes before forming into a circle. Solder the ends together neatly with a simple lap joint.

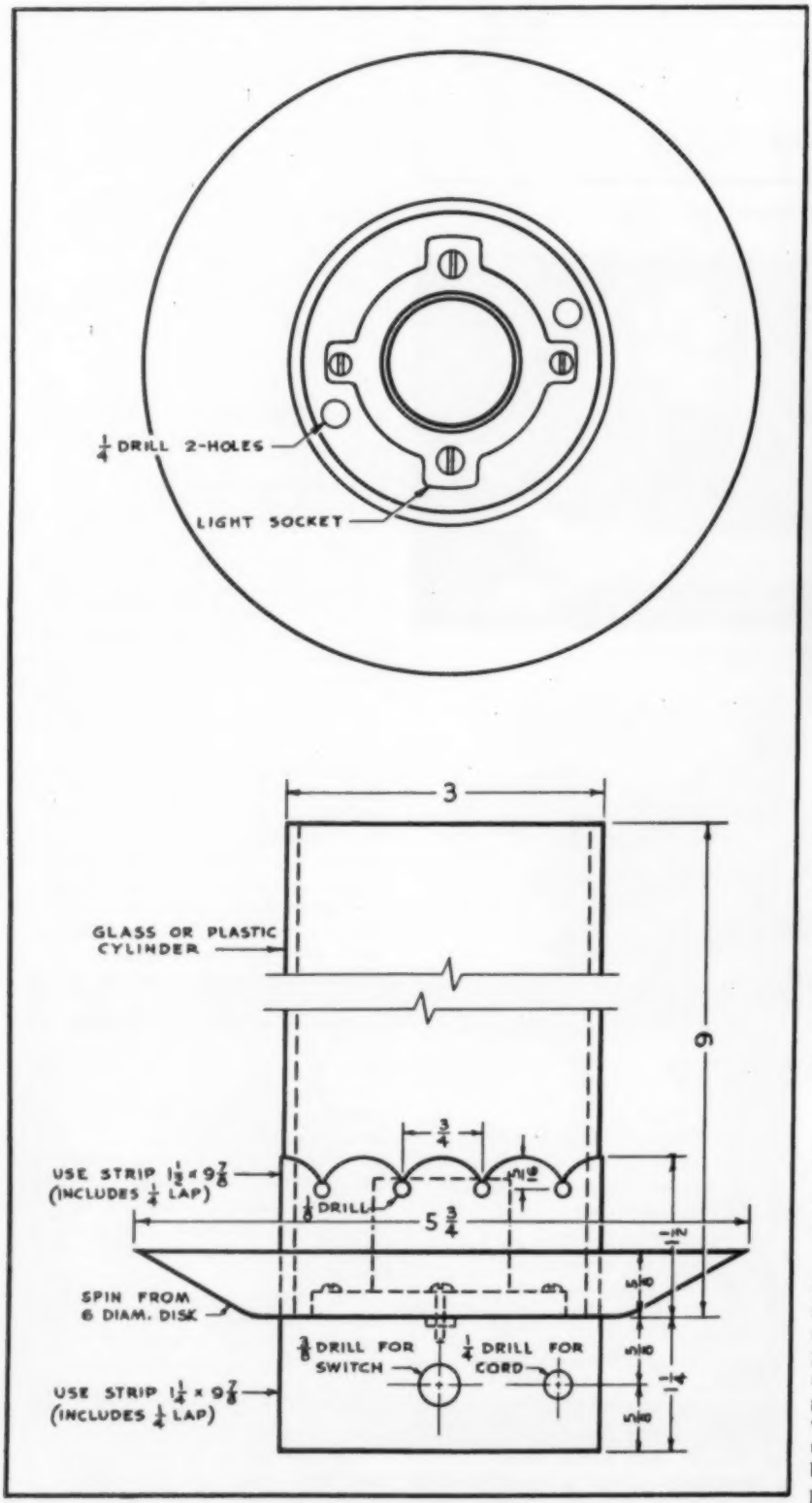
The assembly of the spun disk and the two rings which have been formed is a matter of careful soldering. In order to

prevent the parts which have already been soldered from coming apart, place pads of wet rags on any areas that need protection.

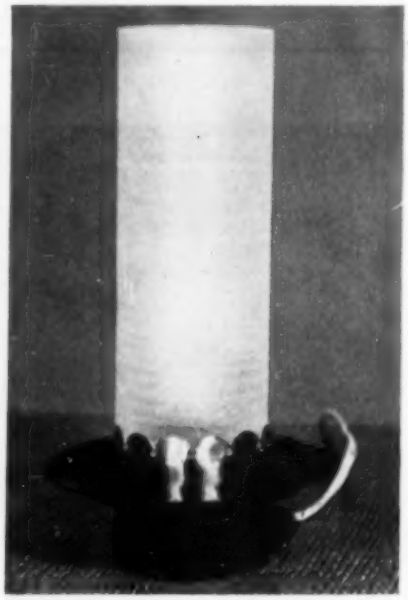
The finish on the original lamp was a semigloss black enamel on all surfaces except the top brass ring. The brass ring was highly buffed and then given a coat of clear lacquer for protection.

Take care that the lacquer does not get on the enameled surface or you will find the enamel coming off.

Assemble the electrical portion of the lamp next. Attach the socket with two small machine screws and then add the switch and the wiring.



Details of the modern lamp



This modern lamp gives the students incentives for metal spinning

The shade can be made of glass with a translucent surface, or you can use a cylinder of clear plastic. The original lamp shows a plastic shade that was roughened on the outside with sandpaper while the cylinder was revolved slowly on the lathe. This provided an attractive and nicely translucent appearance.

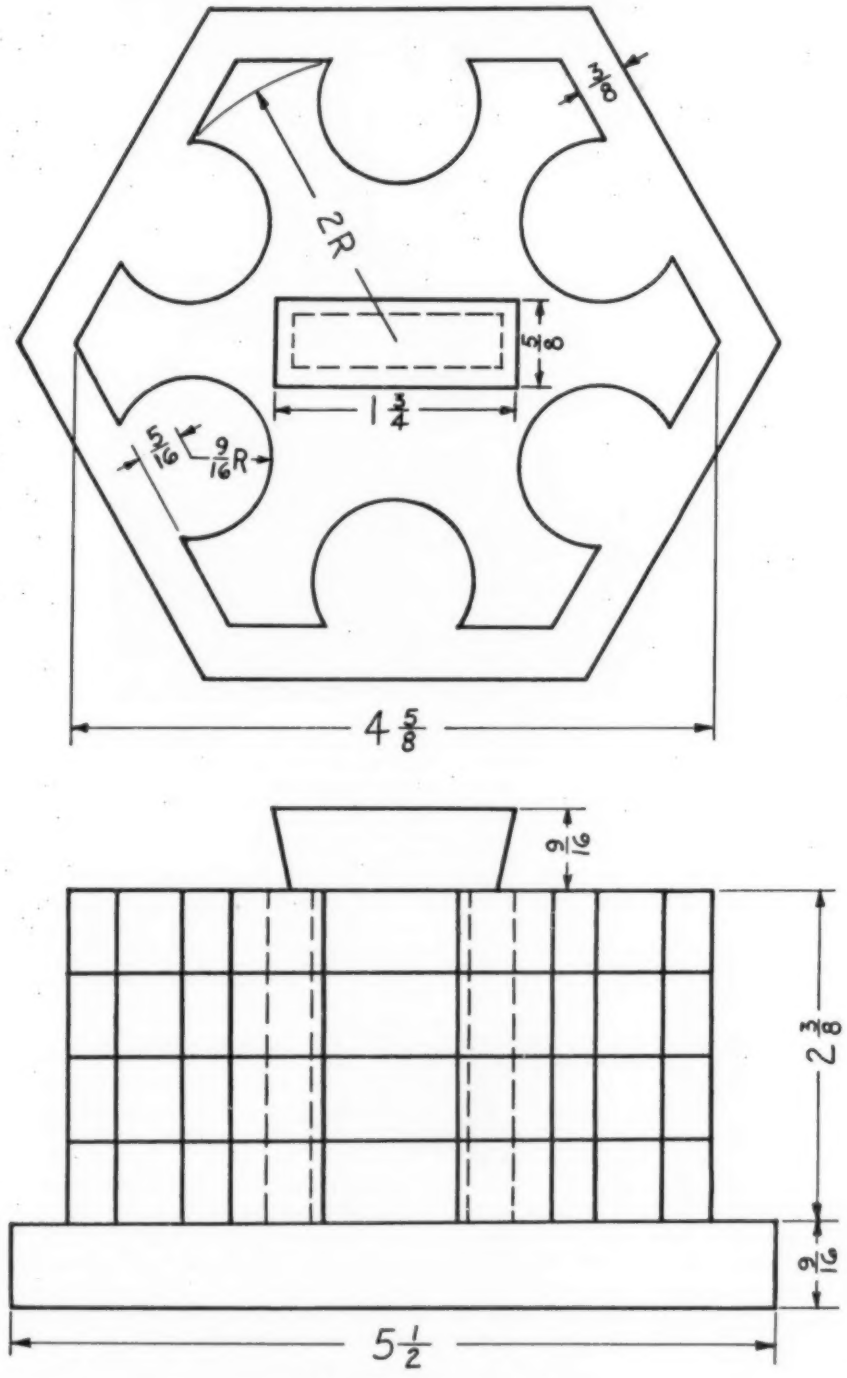
This is the type of lamp that looks especially fine in a matched pair. The chances are good that your students will want to make them as a twosome.

THREAD HOLDER

E. E. LOWELL
El Segundo Junior High School
El Segundo, Calif.

This eye-catching project is one that certainly motivates either a beginner or an advance student. The simplicity of design and the ease of fabrication places this project within the learning capacity of the student. The welcome that mothers will give this spool holder will be ample reward for the student. It can be put into use immediately; no hanging fixtures to buy, and no "where am I going to put it" phrases.

It will hold one dozen spools of thread;



Details of the thread holder

these can be left in the holder or removed very simply. Finish will depend on the type of wood used; it can be constructed in layers of light and dark woods or layers to make a solid block.

Materials: choice of woods: pine, mahogany, ash, or black walnut; glue.

Tools: miter box saw; block plane; brace; expansive bit. Advance students use drill press.

Finishing materials: deft, apply three coats, sand between with 6/0 garnet paper; sanding block; 2/0 and 6/0 garnet cabinet paper; wax, apply two coats.

POOR SPELLING – SO WHAT?

E. ROBERT RUDIGER
Assistant Professor of Education
Stout State College
Menomonie, Wis.

A paramount criticism of today's schools is that they are not teaching youth how to spell correctly. Further evidence of the widespread currency of this criticism was recently revealed in a survey reported by the Commerce and Industry Association of New York. In this survey, supervising personnel employed by 288 companies representing 15 different industries were asked to state their opinions of the spelling abilities of nearly 32,000 high school graduates and nongraduates whom they had observed in work situations. Nearly 84 per cent of these supervisory personnel felt that today's schools were not giving youth adequate training in spelling.

Since spelling, as a basic area of learning, is of such national concern, perhaps it would be well at this time to analyze some of the possible causes for the weakness in spelling exhibited by so many of our students and graduates.

First of all, modern educational methods by which reading is taught train students to recognize a word as a whole, rather than to "sound out" a new word phonetically or by individual letters. Emphasis is also placed upon paragraph comprehension and the ability to scan for central ideas in printed matter. And these modern methods, research studies show, can actually increase reading abilities as much as 500 per cent. In addition to improving the acceleration of reading rate, these studies show also that rapid readers possess greater comprehension of materials which they read.

Although the forementioned technique may be a great advancement in the teaching of reading, it is having a pronounced effect upon the training of youth to spell correctly. Students are now deprived of many of the basic fundamentals of word structure which are so vitally important to any person who desires to learn to spell correctly. Therefore, if we as teachers are to uphold accepted standards of business and society, we must constantly emphasize proper spelling.

Another cause of poor spelling no doubt stems from the constant bombardment of tricky, catchy words appearing daily in modern advertising. From the very first day of birth, a child is subjected to such words as "Evenflo" bottles, "Kiddie Kar," "Kradle Krib," and similar commercial adaptations of standard English words. Unquestionably

these influences are having detrimental effects upon the spelling abilities of youth who are constantly exposed to such trade names.

A third cause of poor spelling ability lies in the fact that even we teachers are generally so engrossed in our own subject matter area that we tend to overlook the spelling deficiencies of our students. Yet if youth are taught in English classes to spell common words correctly, why don't we, in our own classes, demand that they show equal spelling competency with those same words? We expect our students to speak intelligently and write legibly, but when they answer questions on examination papers we tend to accept any answer as "correct" if it even remotely resembles the correct word or the correct spelling of that word. If we use only objective type questions, in which the student merely inserts a symbol for his answer, we can never identify the individuals who can or cannot spell.

Another factor that we must recognize as relevant to the problem of correct spelling is the rapidly growing complexity of our language. The increasing rate of technological developments and resulting terminology placed a further load upon the student who is attempting to read, write, and *spell* correctly the words of his chosen field of endeavor.

Many schools are displaying heightened concern over the poor spelling abilities of their graduates. Special remedial courses in spelling are being organized and in some cases graduation requirements are being broadened to include a course in spelling. However, if we are to improve the spelling ability of our students, such improvements must become the responsibility of each and every teacher.

The English department, it is true, stresses the spelling of commonly used words, but it must become the task of individual instructors to teach the correct pronunciation, meaning, and spelling of technical words peculiar to their own subject fields. Such words as mortise, rabbet, and dado are not taught — and need not be taught — in general English classes; instead, these technical terms must be presented by the industrial arts teacher in the woodwork area. The same technique should pertain to all basic educational fields. And at the very time we are stressing our special technical words, we must demand that students be accurate in spelling the standard English words which they are learning from other sources. . .

Great educators have warned teachers against "compartmentalizing" their instruction, against regarding each subject field as a watertight compartment which has no relationship or elements in common with the instruction of any other teacher. Instead it is our obligation to fellow instructors to put their teaching into actual practice and to uphold their standards in all areas of learning — proper spelling included. Perhaps then and only then will we help youth to overcome the poor spelling habits which have become for them a vocational handicap and which are generating harmful criticism of today's student and teacher alike.

Down comes one of the nation's oldest schools for vocational training as workmen raze the frame structure which James H. Stout, Wisconsin's lumber pioneer and four-time state senator, erected at his own expense in 1891 in Menomonie, Wis., so that "every girl could learn to cook, sew, and raise a family and every boy could have training in a manual skill." The building, which attracted much wide educational notice at that time, is being removed for the erection of a new student union at Stout State College.

— T. F. Fleming, Director of Public Relations, Stout State College

WESTERN PINE REGION TOPS 1300-MARK IN TREE FARMS

The tree farm program in the 12-state Western Pine region has just passed the 1300-mark in numbers and the 6,500,000-mark in total area.

During April 37 tree farms were certified, two others were increased in acreage, and two were canceled, making the regional total now 1314 comprising 6,605,580 acres.

Twenty-nine of the newly certified tree farms are in Eastern Washington, eight in California.

California's lead in Western Pine tree farm acreage increased, with 1,956,157 acres now certified in 205 tree farms. Eastern Oregon is second with 1,635,993 acres in 107 units, and Idaho third with 999,844 acres in a regional high of 655 tree farms.

Eastern Washington's additions brought the number of Western Pine tree farms there to 274, second only to Idaho's 655, with a total of 669,857 acres.

The pine region's program now shows about 28 per cent of all privately owned forest land in the entire region certified as tree farms. Growth of the movement continues brisk, and it is especially gratifying to note so many small owners going in for tree farming. More than three fourths of all the Western Pine tree farms are small ownerships — farmers, stockmen, and others. Most of the lumber companies that own timberlands have gone in for tree farming. Nearly three fourths of all forest land in the region is government-controlled and therefore not eligible for tree farm certification. The tree farm program is for private lands only.

— *Western Pine Association.*

STANLEY SHOP TALK

NOW STANLEY "SURFORM" HAS FOUR BLADES

You can now have Surform blades of four different types for your shop . . . and all four fit the same file type tools. Now available are:

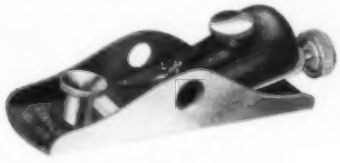
No. 294B—Regular blade **No. 298B—Half round blade**
No. 394B—Fine cut blade **No. 398B—Half round fine cut blade**

Stanley "Surform" Tools have Sheffield tool steel blades with 450 cutting edges. They make quick work of fitting, trimming, smoothing wood, plywood edges, plastics, soft metals, etc.

"BOY-PROOF" HAND TOOLS

NO. 40 WOOD CHISEL

This sturdy chisel has 4½" one-piece alloy steel blade and tough plastic handle permanently attached. Complete range of sizes. Trouble-free tool with long useful life in school shops.



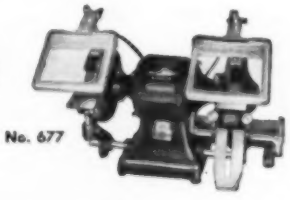
NO. 118 BLOCK PLANE

An all-steel, low angle block plane, this Stanley "100 PLUS" tool consists of only 3 pieces and the locked-in cutter adjustment prevents thread stripping or lost parts.

NO. 610 HAND DRILL

This hand drill has enclosed gears for maximum safety, a solid handle and a chuck that cannot come off the spindle. Jaw springs protected.

BENCH GRINDER



No. 677

Especially designed for the school shop. The grinding attachment is for all chisels and plane irons up to 2⅝" wide. Equipped with "Flud-Lite" Eye Shields that cannot be moved to non-guarding position.

NEW ELECTRIC DRILLS

Stanley recommends the ¼" H133 with 1100 rpm full load speed and ⅜" H136 with 500 rpm full load speed for school use. Full ball-bearing, lifetime lubrication and low temperature rise. Trigger switch with locking pin at base of non-slip grip. 3-jawed geared chuck.

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Personal News

GENE ESSEX RETIRES

About 120 faculty members of State University Teachers College, Oswego, N. Y., and their wives paid tribute to retiring Associate Professor of Industrial Arts Ceramics Gene Essex and Mrs. Essex at the annual Faculty Dinner at Hotel Pontiac on May 25, 1958.

Mr. Essex was presented with gifts by the Industrial Arts Department staff, and by members of the faculty, as well as receiving a lifetime membership from the Central New York Industrial Arts Teachers Association and a certificate from the association in appreciation of his "many years of devotion and service in industrial arts education."

Two men who were on the Industrial Arts Division faculty when Mr. Essex came to Oswego in 1929, told about his service to students. They were Jay Rudolph and Arthur Hauler.

Four members of the Industrial Arts Division faculty told of their experiences as members of Mr. Essex's classes as undergraduates at Oswego. They were Robert D. Helsby, acting division director; Taylor Harter, associate professor in industrial arts general shop; Dr. John A. Storm, professor of industrial arts education; and Earl Spaar, associate professor of industrial arts graphic arts.

The anecdotes brought out much of Mr. Essex's philosophy and good humor, as well as pointing out his significant contributions, including fathering the general shop at Oswego, and doing much to promote the general shop movement in New York State and the United States, his contributions to curriculum revision in the industrial arts department, and his work as chairman of the faculty's Courtesy Committee.

MR. MILLER IN NEW POST

Kenneth R. Miller, a member of Omicron chapter of Iota Lambda Sigma, recently joined the administrative staff of Southern Illinois University at Carbondale, Ill. He comes to Southern from the presidency of Ohio Mechanics Institute at Cincinnati, which position he had held since 1954.

Kenneth R. Miller

Mr. Miller is a native of Auburn, Maine, and served in the U. S. Navy for two years with a final rank of Lieutenant, Junior Grade.

He received bachelor of arts and bachelor of science degrees from Ohio State University, and a master of science in education from Butler University, and has done graduate study at the University of Cincinnati.

He served eight years as State Director of the Indiana Society for Crippled Children before moving to Cincinnati in 1951. He served as Executive Director of the Greater Cincinnati Safety Council for two years before becoming president of Ohio Mechanics Institute.

Mr. Miller also has been a personnel assistant for the Carborundum Company, a market researcher, and a guidance counselor for the Elyria, Ohio, public schools.

He was a member of the board of directors of the Cincinnati Adult Education Council, the Cincinnati Museum of Natural History, the WCET educational television station, and the National Technical Institute Foundation, while in Cincinnati.

LAPPIN RECEIVES DOCTORATE

Alvin R. Lappin, assistant professor of industrial arts, San Jose State College, California, has been awarded the doctor's degree by Wayne State University, Detroit, Mich. His research consisted of a national survey of departments of industrial arts teacher education culminating in a dissertation entitled: "An Evaluation of Procedures for Introducing New Materials, Tools and Processes in Industrial Arts Teacher Education."

Dr. Lappin began preparation for a career in education while attending Frank Wiggins Trade School (Los Angeles Trade-Technical Junior College) through the encouragement of Benjamin Johnson, then director of the school, and Alf Dahl, instructor in the mill-cabinet department (retired). After being graduated in 1937 Dr. Lappin enrolled at Santa Barbara State College (University of

(Continued on page 20A)

SHELDON

Builder of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes

It only takes one good Milling Machine and a capable Shaper to triple the value of your shop course

No course in shop practice can be complete without basic instruction on the milling machine and the shaper.

For this no other units equal the size "0" Sheldon Milling Machine with its hand and power table feed, quick-change gear box, variable speed drive, back geared unit, and interchangeable vertical milling head attachment. No other shaper is better suited for class work than the ample size Sheldon 12" Back Geared Shaper with its large capacity, long stroke, variable speed drive, weight and accuracy.

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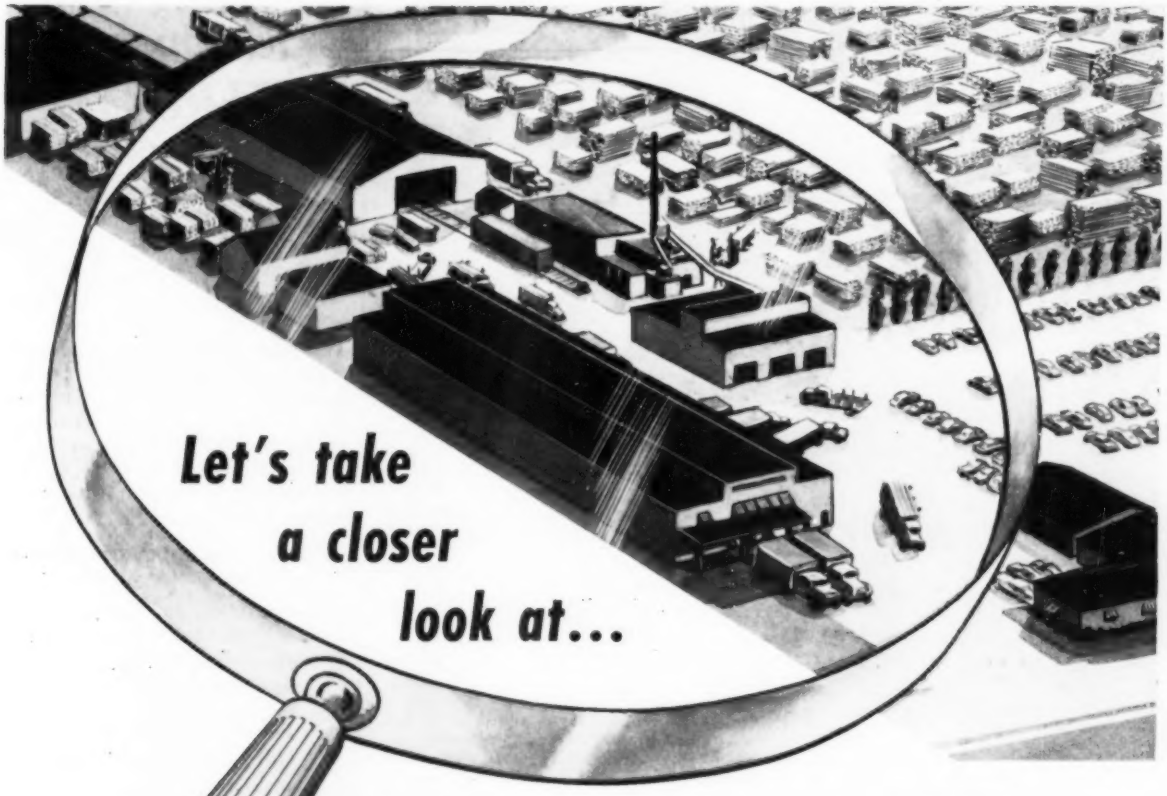

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- Moreover, B-G not only brings new and wanted products to you through our exhibits at your state and national shows, but also offers at no extra cost as part of its customer service complete planning counsel and assistance for establishing, enlarging or modernizing industrial arts departments through our many district representatives who are always at your call. In addition, our intense interest in the over-all school shop program crystallizes into active participation in many scholarships for the furthering of vocational and industrial education.
- So, for shopping with confidence and convenience – and complete assurance of absolute satisfaction, take advantage of B-G's one stop shopping service on all your needs, whether large or small.

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FOR WATERPROOF GLUING

Completely waterproof two-component resorcin resin glue forms a bond stronger than the wood itself. Resists continuous outdoor exposure, cold and boiling water, moist and dry heat, mold and fungus, solvents, acids and alkalis. Unbeatable for boats, outdoor furniture, sports equipment. Packed in ¼ pint to 5 gallon units.

FOR STAIN-FREE WOOD GLUING

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For complete information and prices, contact your supplier or write The Borden Chemical Company (a division of The Borden Company), 350 Madison Ave., New York 17, New York.

PERSONAL NEWS

(Continued from page 18A)

California) where he studied under Professor E. E. Ericson. He was awarded the A.B. degree in 1939 and began teaching elementary industrial arts in the Los Angeles City Schools, where he advanced through junior high, senior high, and adult education levels of teaching. He left teaching in early 1942 for an Air Corps assignment which placed him as supervisor in Air Corps Technical Schools. A special assignment on the experimental model of the first P-80 jet airplane took him to the Lockheed Aircraft Corporation in Burbank, Calif., as a wood and plastics fabrications technician for three and a half years. After a tour of active duty with the Fourth Air Force Dr. Lappin returned to industry for another year and a half before accepting a position with the Salinas School District in Central California. At Salinas High School he organized and established the first full-time industrial arts plastics shop in California. In 1950 students from his classes won several of the top awards in the Industrial Arts Awards Competition sponsored by the Ford Company, including the outstanding achievement award in the plastics division.

At the end of the school year Dr. Lappin resigned his tenure at Salinas and moved to Detroit, Mich., to attend Wayne State University for two years. He was awarded the master's degree in 1951. He returned to California in 1952 to direct a pilot program in vocational rehabilitation for the Veterans Administration. In 1954 he was appointed to the staff of the Los Angeles State College of Applied Arts and Sciences where he spent the next two years helping to organize and develop the industrial arts department. In 1956 he transferred to San Jose State College, California, where he is chairman of woodworking and allied activities in the industrial arts department.

Dr. Lappin is listed in *Who's Who in American Education*. He has been active on a local, state, and national level in industrial education professional organizations, and holds membership in Phi Delta Kappa, Epsilon Pi Tau, and Mu Sigma Pi. His contributions to the professional literature include articles in *Industrial Arts and Vocational Education*, *American Vocational Journal*, *School Shop*, and *A Guide to Improving Instruction in Industrial Arts*.

NEW VOCATIONAL DIRECTOR IN MILWAUKEE

Dr. George A. Parkinson, formerly vice-provost of the University of Wisconsin-Milwaukee ended his 35-year association with the university to become the new director of the Milwaukee Vocational School. He was appointed by the Vocational School Board to succeed William F. Rasche, director since 1940, who has retired. Dr. Parkinson took over his new duties on August 1, 1958.

Dr. Parkinson was in charge of the University of Wisconsin extension night school from 1932 to 1940, and after a five-year interruption while he was in active service with the Navy, he returned as director of the University Extension School. He became vice-provost and director of business affairs of the University of Wisconsin-Milwaukee when it was formed in 1956 by the merger of the extension and Wisconsin State College.

He is active in civic affairs and also a leader in civil defense and naval reserve activities. He has been deputy director of the Milwaukee civil defense organization since 1948, and is director of the naval reserve officers' school in Milwaukee, with the rank of rear admiral.

Education is DIFFERENT!

If your course is a failure you can't just scrap the material and start over with a fresh batch. Because the "material" in this case is a group of students who may spend years overcoming the handicap imposed upon them by your faulty course preparation.

That's why experienced educators make it a habit to begin the new school year with a sizeable quantity of American "Tech-books" on hand. American Tech textbooks and study guides are precision made teaching instruments — designed to *eliminate* course failure.

Send for On Approval copies of these texts for 1958 —

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   Rusinoff **$6.50**
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   (Second Edition)
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3. Basic Aeronautical Science and Principles of Flight
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4. Electricity and Electronics — Basic
   Steinberg-Ford **$4.50**
5. Graphic Arts Procedures
   (Second Edition)
   Karch **$4.75**
6. How to Plan a House
   (Third Edition)
   Dalzell-Townsend **$6.95**
7. Manufacturing Processes — Production
   (Second Edition)
   Rusinoff **$7.25**
8. The Practical Dictionary of Electricity and Electronics
   Oldfield

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He was on active duty with the Navy from 1940 to 1945, and was awarded a Legion of Merit citation and a bronze star with gold star.

He is vice-chairman of the Metropolitan Study Commission and a board member of the metropolitan Milwaukee YMCA.

Dr. Parkinson received a bachelor's degree in education from Ohio State University in 1922, a master's degree in astronomy and mechanics from the same university in 1923, and a doctor of philosophy degree in applied mathematics from the University of Wisconsin in 1929. He joined the Extension Division faculty in 1927.

Dr. Parkinson is married and has two children.

MR. NEWTON RETIRES FROM TEACHING

F. N. Newton, Jr., a teacher in the Sharon Schools, Sharon Pa., for the past 28 years, retired at the end of the school term, June 6, 1958. For part of the time spent in the Sharon Schools, Mr. Newton also taught in Sharpsville, Pa. For the past 18 years he has been teaching Engineering Drafting and Descriptive Geometry for Penn State University in their Extension Technical institute in Sharon, and for the past ten years Mr. Newton has been the Area Administrator of the program in Sharon.

Active in civic work he is past commander of the Sharpsville Post 162 of the American Legion, was chef de gare of the 40et 8, Mercer County Voiture 846, and has served as secretary of the Sharon Civil Service Commission for 17 years.

Indicative of Mr. Newton's determination and ambition is the fact that he was graduated with honors in receiving his B.S. degree in engineering from Penn State in 1935, then after raising a family returned and received his master's degree in 1949.

After serving a three-year apprenticeship as a machinist and while employed in the engineering department of the Carnegie-Illinois Steel Company, he instructed part-time at Sharpsville schools for a period of 10 years, then taught for seven years at both Sharon and Sharpsville before taking over full time at Sharon.

For a number of years Mr. Newton operated a most effective placement program and follow-up system for graduates of his industrial arts department, and this most interesting phase of his work was finding jobs for his "boys."

After a summer trip to the West Mr. Newton plans to become a sales representative of a firm dealing in engineering supplies and drafting materials.

News Notes

GRADUATE TRAINEESHIPS OFFERED

New York University is offering 28 graduate traineeships in vocational rehabilitation counseling for the 1958–59 academic year.

Supported by a grant from the Office of Vocational Rehabilitation of the Department of Health, Education, and Welfare, the traineeships range in value from $1,800 to $3,400 and can be renewed for a second year of study.

NYU's School of Education has a two-year program leading to the master's degree in vocational rehabilitation. The program includes clinical practice.

The traineeships are also available for study toward the doctor's degree.

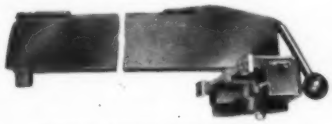
College graduates who are citizens of the

(Continued on next page)

HERE'S PROOF OF PERFORMANCE
"The CLAUSING is the finest saw in its class . . ."
Howard Hubbard, Instructor
Gresham High School, Gresham, Oregon

"The CLAUSING is the finest saw in its class..."

HEAVIER CRADLE ARM AND TRUNNIONS
Thick, heavily ribbed grey-iron, cast in box shape for maximum strength. Trunnions, cast integrally with 1" thick x 16½" long support members, absorb heaviest cutting loads.



DOUBLE-LOCKING LIFT-OFF FENCE
An exclusive *Clausing* feature. Slides smoothly, easily. Rigid . . . extends full depth of table . . . locks at both ends . . . one movement of lever and fence is anchored in place or released for lifting off!

For ease of operation, safety, and accuracy the Clausing 10" Floor Saw is in a class by itself. *It's ruggedly built* with 3 HP construction throughout. Has totally enclosed 1 to 3 HP continuous duty motors . . . cast iron base . . . modified wedge cog belt drive . . . big, self-cleaning worm and rack mechanisms.

It's unmatched for safety. Has exclusive clear-vision guard, double locking fence, big mitre gauge with 8¾" x 2" face. Motor enclosed in base.

It's easy to operate. Weight of motor is balanced by torsion spring mechanism. Fence glides to the position you want it – lifts off for removal or positioning either side of blade. Handwheels are 8" in diameter – exclusive tilt dial is bigger, too, for easy reading.

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NEWS NOTES

(Continued from previous page)

United States or who have indicated that they will become citizens are eligible for the grants. Interested persons should write immediately to *Dr. Roland H. Spaulding, Department of Vocational Education, New York University, Washington Square 3, N. Y.*

TEACHING SCHOLARSHIPS ESTABLISHED BY PRINTING INDUSTRY

Two scholarships for students desiring to prepare themselves as graphic arts teachers have been established by the National Scholarship Trust Fund of the Education Council of the Graphic Arts Industry. The scholarships, carrying a grant of $500 each per year for four years, were made possible by John M. Wolff, vice-president, Western Printing and Lithographing Company, Southwestern Division, St. Louis, Mo.

INDUSTRIAL AUDIO-VISUAL EXHIBITION

Due to the great success of last year's Industrial Audio-Visual Exhibition, October 7–10 has been set for the 1958 show to be held once again at the New York Trade Show Building in New York City.

Because the reception given this show by both exhibitors and visitors was so enthusiastic, New York has proved itself a center for the industrial A-V field. Many companies have already expressed a desire to participate again in this year's exhibition.

This exhibition, organized by Industrial Exhibitions, Inc., 17 East 45th St., New York 18, N. Y., will be held under the auspices of different leading organizations, among them the National Visual Presentation Association, who will hold during this event their sixth annual day of visual presentations and will conduct several workshop sessions.

STUDENT PROJECT FAIR

The Industrial Arts Club and the Industrial Arts Department of Northern Illinois University, DeKalb, sponsored a Student Project Fair on April 18 and 19. There were 450 entries representing 31 schools located in the northern 21 counties of Illinois.

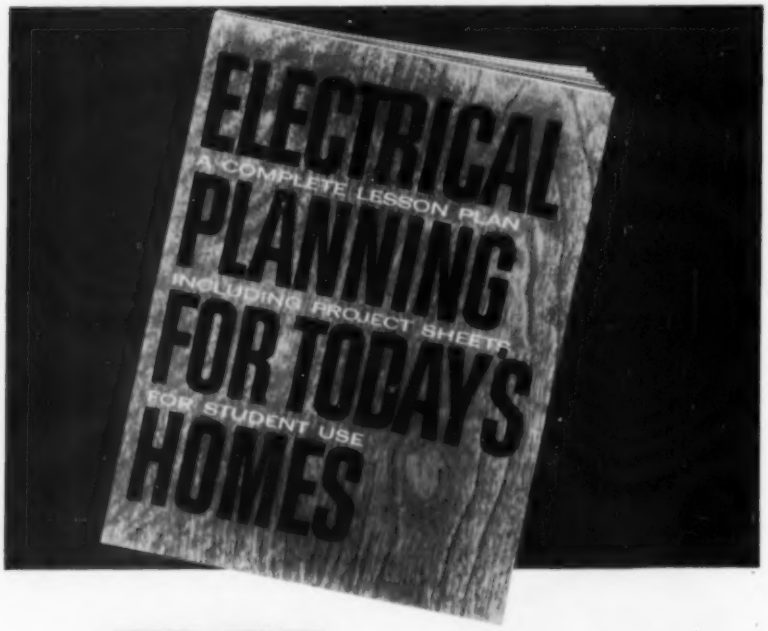
Prizes consisting of United States Savings Bonds, merchandise, pins and certificates, were awarded in each of eight areas: woodworking, machine metals, general metals, drawing, crafts, electricity, graphic arts, and open. There was both a junior and senior division in each area. The prizes, amounting to over $600, were contributed by 35 local and national business and industrial organizations.

The general chairman of the Fair was Dr. George W. Senteney, assistant professor of industrial arts. The student chairman was Ronald E. Hughes, a junior in industrial arts teacher education.

"NEW WELDING PROCEDURES"

This comprehensive, informative sound film is an educational, yet entertaining combination of the theoretical and the practical. It not only describes the basic ideas behind modern welding procedures, but *demonstrates* in full detail the step-by-step solution to common welding problems. It offers new ideas and methods which can be used to advantage and profit in any connection with the metalworking industries.

This film is available to teachers of welding, weld designers, students of welding, and others from *Eutectic Welding Research, Inc., 40–40 172nd St., Flushing 58, N. Y.* This organization sponsors research in development work and other projects in the interest and advancement of the arts and science of welding.



FREE teaching aid

Helps students to learn the difference between minimum "Code" wiring and wiring that provides a home with full HOUSEPOWER. Simple, easy-to-understand; will encourage class discussion. The project has been specifically prepared by The National Adequate Wiring Bureau in response to requests by vocational teachers for material about adequate wiring.

ELECTRICAL PLANNING FOR TODAY'S HOMES is presented in the form of a series of true-false questions and answers. It interprets technical theory in terms of the householder's daily use of electricity, based on the standard contained in the Residential Wiring Handbook developed by the Industry Committee on Interior Wiring Design.

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Please send me free copy of teaching aid "Electrical Planning for Today's Homes."

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(Please print)

School _____

Street _____ City _____ Zone ____ State _____

New Publications

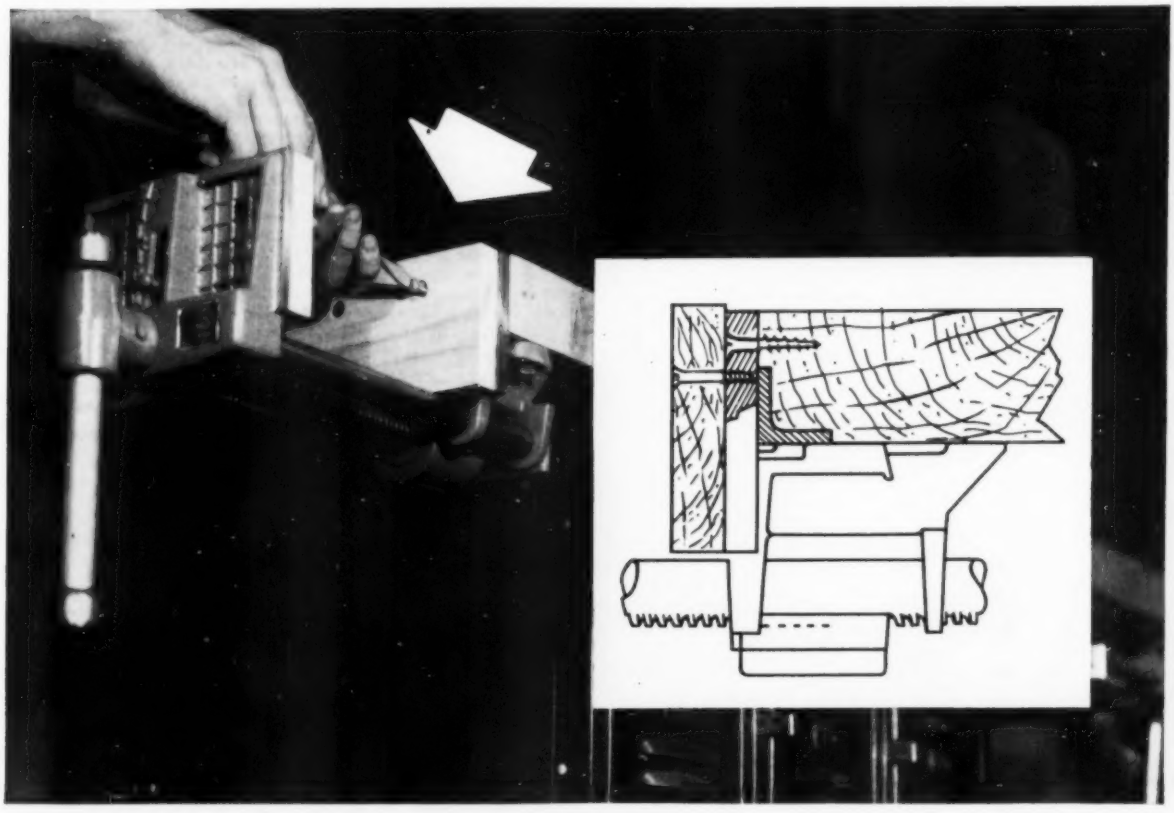
Induction Motors — Single-Phase & Polyphase

By Charles S. Siskind. Cloth, 390 pp., 6¼ by 9¼ in., illus., $7.50. McGraw-Hill Book Co., Inc., New York 36, N. Y.

The author of this text has had a wide experience in practical and consulting engineering, and in teaching in colleges, universities, and technical schools. This text shows his grasp of the subject about which he has written. The book will be warmly welcomed by engineers, students, and technicians.

The 12 chapters of the book give clear explanations of polyphase induction motor principles, single-phase induction motor principles, polyphase windings and connections, single-phase windings and connections, polyphase winding changes, multispeed-motor windings, fractional-slot windings for polyphase motors, starting and control of single-phase motors, starting and braking of polyphase motors, speed control of polyphase motors, winding calculations for polyphase motors, and characteristics and applications of polyphase motors. The last chapter gives an extensive list of visual aids and the sources from which the films can be obtained.

(Continued on page 24A)



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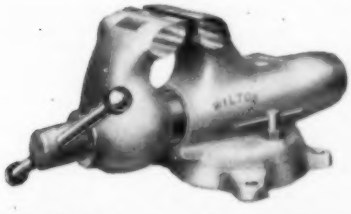

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NEW PUBLICATIONS

(Continued from page 22A)

Granite Cutting

By G. A. McGarvey and H. H. Sherman. An analysis of the granite cutter's trade together with specimen instruction material for the use of apprentices and journeymen workers. Paper cover, 247 pp., 5⅞ by 9⅛ in., illus., 35 cents. United States Department of the Interior, U. S. Government Printing Office, Washington, D. C.

Trends in Production of Curriculum Guides

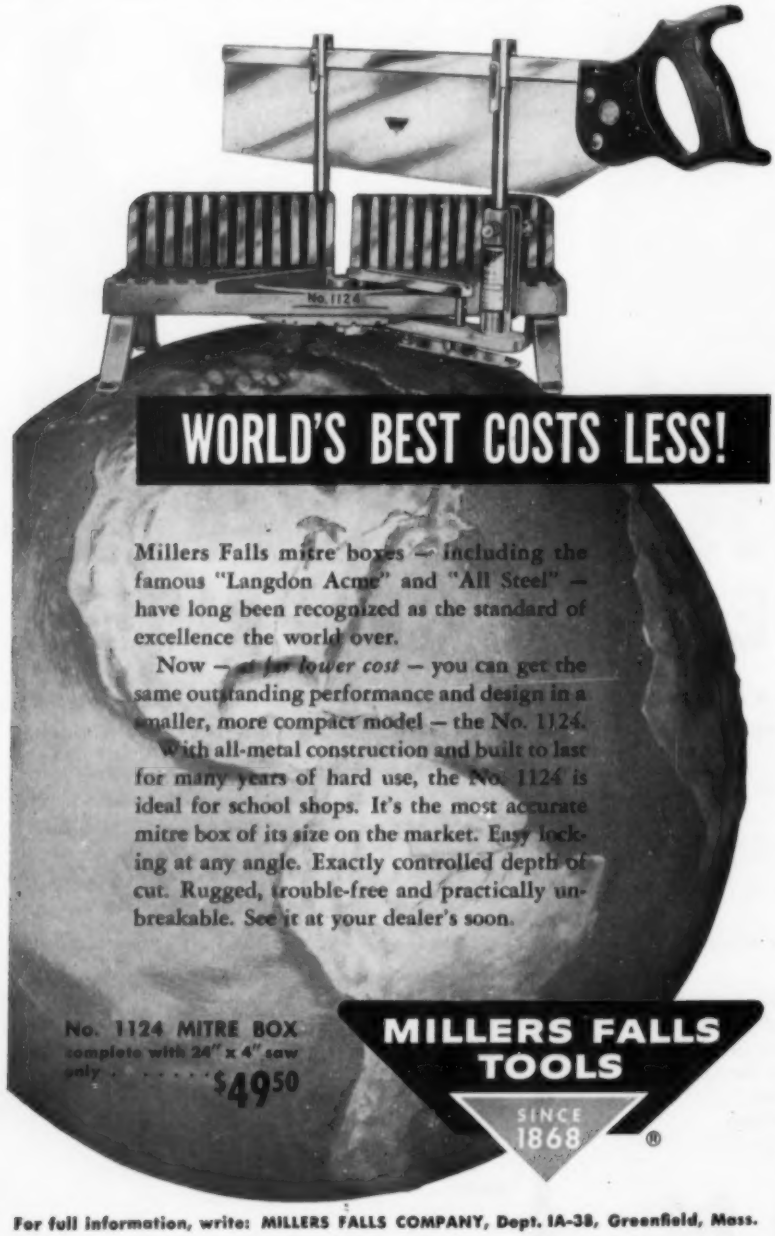
A survey of courses of study published in 1951 through 1953, by Eleanor Merritt and Henry Harap. Paper cover, 43 pp., 6 by 9 in., illus., 50 cents. Division of Surveys and Field Services, George Peabody College for Teachers, Nashville, Tenn.

This monograph supplies help to teachers, supervisors, and administrators who have devoted countless hours of hard labor to the preparation of curriculum bulletins.

A Plan for Living

By Oscar G. Mayer. Cloth, 24 pp., 6½ by 8⅝ in. Oscar Mayer & Co., Madison 1, Wis. Foreword by Miller Upton, president of Beloit College.

A Plan for Living is a speech delivered to the students of Beloit College by Oscar G. Mayer, in which he expresses his workable formula for living a sensible, constructive life. This brief essay has attracted wide attention because of its universal applicability to all personal relationships.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Vocational and Professional Monographs

No. 37. The Restaurant Business. By Walter O. Voegele. Paper cover, 36 pp., 6 by 9 in. Covers all types of commercial food service establishments. Bellman Publishing Co., Cambridge, Mass.

No. 73. The Linotype Operator. By Oscar R. Abel. Paper cover, 32 pp., 6 by 9 in. Discusses the Linotype machine, working conditions, training required, employment outlook, etc., and contains a bibliography. Bellman Publishing Co., Cambridge, Mass.

No. 79. The Pharmaceutical Industry. By John O'Neill Closs. Paper cover, 28 pp., 6 by 9 in. A description of the pharmaceutical industry and the career opportunities available are included along with other pertinent information on the trade. Bellman Publishing Co., Cambridge, Mass.

General Society of Mechanics and Tradesmen of the City of New York

Paper cover, 115 pp., 6 by 9 in., illus. One hundred and seventy-first annual report for the year ending 1956.

Women in the Federal Service 1954

A United States Department of Labor pamphlet — Women's Bureau. Paper cover, 15 pp., 5⅞ by 9 in., 15 cents. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

This pamphlet covers high lights in women's employment opportunities, employment trends, job locations, employment standards, grades and salaries, variety of occupational opportunity — namely, clerical occupations, semi-professional, professional, and administrative positions.

The Complete Lumber Table

By Robert A. Hardin, University of Oklahoma, Norman, Okla. Spiral binding, 20 pp., 4½ by 8½ in.

This table gives the board foot content of all sizes of boards from one inch to sixteen inches in width and from one inch to twenty feet in length, including fractional lengths. For the use of the shop teacher; also for members of the "do-it-yourself" clan.

Improve Your Learning Ability

A Life Adjustment Booklet by Harry N. Rivlin. Paper cover, 47 pp., 5½ by 8½ in., illus. Science Research Associates, Inc., Chicago, Ill.

Pioneering in Health

The 1956 Annual Report of The National Foundation for Infantile Paralysis, New York, N. Y. Paper, 88 pp., 5¼ by 8½ in., illus., foreword by Basil O'Connor, president.

Summaries of Studies in Agricultural Education

An annotated bibliography of studies in agricultural education with classified subject index — supplement No. 8, Vocational Division Bulletin No. 256, Agricultural Series No. 66. U. S. Department of Health, Education, and Welfare Office of Education, Washington, D. C. Paper cover, 108 pp., 5¾ by 9⅛ in.

Occupational Information for Counselors

An annotated bibliography. United States Department of Labor, Washington, D. C. Paper cover, 16 pp., 5¾ by 9 in. Foreword by James P. Mitchell, secretary of labor.

Impedance Matching

Edited by Dr. Alexander Schure. Paper, 128 pp., 5½ by 8½ in., illus., $2.90. John F. Rider Publisher, Inc., New York 11, N. Y.

A comprehensive text dealing with the problems of impedance matching at audio, radio, and higher frequencies. The book treats all kinds of devices used as the generator and a wide variety of equipment used as the load in electrical and electronic circuitry. It also explains the theory underlying problems of impedance matching as well as the solutions. Numerical examples illustrate the application of appropriate equations.

Basic Aeronautical Science and Principles of Flight

By Robert D. Blacker. Cloth, 242 pp., 6¼ by 9¼ in., illus. American Technical Society, Chicago, Ill.

This is a very interesting text on the subject of the operation of an aircraft, and on the science of flight.

With the increase of air travel, many more persons must know about aviation. This book has been written to give all those who desire to understand this subject, a fine introduction. The explanations are clear and succinct, and the illustrations are excellent.

The 12 chapters discuss the subject under the following headings: a cinemascope view of aviation, people and planes, forces and motion, man's new environment, the aircraft fuselage, the wings and empennage, the landing gear, powerplants, instruments, power systems, and auxiliary equipment, the fundamentals of flight, and meteorology and navigation.

How to Build 20 Boats

By Boris Lauer-Leonardi. Cloth, 128 pp., 6¾ by 9⅞ in., illus., $2. Arco Publishing Co., New York, N. Y.

This book will be thoroughly enjoyed by many woodworkers, homeworkshop enthusiasts, and boat lovers. It presents 20 boat designs, from the narrow bottomed rowboat, through the outboards, cruising auxiliary, duckboat, sloop, ketch, catamaran, inboard cruiser, launch, pram, and kayak.

Fabricating With Formica

By James M. O'Neill. Cloth, 64 pp., 7 by 10⅜ in., illus., $3.50. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

An excellent text which will be very useful to the student in the school shop, to the practical cabinetmaker, and to the worker in the home shop who wants to do things for himself.

The book gives plain but thorough instructions for every step that has to be undertaken in using formica.

The book starts out in showing how formica is made, how it may be cut to shape, to what types of material it may be glued or cemented, and how this cementing is to be done, and what kinds of cement is to be used.

Either hand or power tools may be used when working with formica.

The book also explains the different types of trim that may be used, and shows how it is applied.

The Encyclopaedia of Radio and Television

Paper, 736 pp., 6⅛ by 9 in., illus., $12. Prepared by a team of 13 well-known authorities. Philosophical Library, New York 16, N. Y.

This is the second edition of this book. It was prepared by a team of 13 well-known authorities. It contains a wealth of descriptive material, a wide range of formulas, worked examples, and data of various kinds. Mathematical explanations, however, have been reduced to a minimum.

The book presents a great deal of practical information for engineers, service mechanics, radio operators, amateur radio enthusiasts, students, and others interested in the technical side of radio and television.

The book contains over 3000 entries, and nearly 800 illustrations. An appendix containing about 100 entries has been added. This deals in the main with frequency-modulated V.H.F.

Basic Bookbinding

By A. W. Lewis. Paper, 144 pp., 5¼ by 8 in., illus., $1.35. Dover Publications, Inc., New York 10, N. Y.

The enormous growth in the sale of intellectual paperbacks has created a demand for literature on binding such books so they will give longer service.

This book thoroughly describes, in simple terms, all that must be known about the equipment, materials, and the basic operations required such as cutting with straightedge and knife, handling large pasted sheets, collating, knocking-up square at head and back, paring leather with edging knife, and using other bookbinding tools.

A Survey of Graphic Arts Education

Conducted jointly by the Education Council of the Graphic Arts Industry, Inc., and the International Graphic Arts Education Association, Inc. Paper cover, 50 pp., 8½ by 11 in.

This is a survey of graphic arts education in elementary schools, in junior high, senior

(Continued on following page)

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Four new "package deals" of Di-Acro Precision Machines are now offered to *school shops only* at these low prices. Brake and Roller are Spartan models, designed especially for schools. Bender, Notcher and Shear are industry proven. Benches are heavy gauge steel.
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NEW PUBLICATIONS

(Continued from previous page)

high, vocational high schools, and in junior colleges, technical institutes, in teacher training institutions, in colleges and universities other than teacher training, and in schools for the handicapped and other institutions, by state.

Knife Grinding and Woodworking Manual

By C. G. Monnett, Jr., published by Dependable Machine Co., Greensboro, N. C. Paper cover, 171 pp., 8¾ by 11¼ in., illus.

The contents of this book are divided into Parts I — Introduction; II — Essentials for Good Grinding; III — Composition, Care and Use of Grinding Wheels; IV — Development, Selection and Care of Cutter Heads and Knives; V — Grinding Cutter Heads and Knives; VI — Balancing Knives; VII — Setting Knives; VIII — Cutting Angles and Bevels Required for Knives and Cutters; IX — Jointing; X — Cutting Speed, Feed Speed and Energy Consumption; XI — Moulder Operation; XII — Moulder, Planer, Etc., Machine Stoppages and Their Remedy; XIII — Structure of Wood; XIV — Wood Defects; XV — Safety; XVI — Common Woodworking Pattern Names; and XVII — Lumber Abbreviations.

Emergency Care Chart

Prepared by: Department of Health, Physical Education and Recreation, Minneapolis Public Schools; and printed and distributed by Minneapolis Public Schools. A paper-backed chart 8½ by 12¼ in., containing specific instructions to follow, as set up by the schools of Minneapolis, in accident prevention, in the care of emergency illnesses at school, and in administering first aid.

Individual instruction pages in this chart cover the following: emergency procedure for serious accidents; bleeding; shock; head injuries; fainting and unconsciousness; animal bites; fracture or suspected fracture; nosebleed; convulsions; burns; heart attack; other miscellaneous injuries such as sprains, splinters, cuts, abrasions, bruises, accidents to employees; emergency care at general hospital; injuries to eyes, ears, and mouth; and artificial respiration.

Machine Trades I and II

Edited and distributed by the Trade and Industrial Education Instructional Materials Laboratory, Ohio State University College of Education, Columbus 10, Ohio.

Both manuals, spiral binding, 8½ by 11 in., illus. Part I, 320 pages, covers bench work, drilling machine work, lathe work, turret lathe work, and power saw work. Part II, 355 pages, continues with shaper work, milling machine work, planer work, grinder work, heat treating, and gears and gearing.

Leathercraft

By Chris H. Groneman. Cloth, 158 pp., 6½ by 9¾ in., illus., $3.68. Chas. A. Bennett Co., Inc., Peoria, Ill.

Stressing fundamentals and projects, *Leathercraft* is a detailed, step-by-step guide to anyone who wants to work with leather. The first 76 pages are devoted, more or less, to the rudiments of leatherwork such as kinds of leather, cutting leather, surface tooling and modeling, stippling and stamping design, embossing, edge creasing, sewing, punching holes, setting eyelets and rivets, forming folds, cleaning and finishing leather, braiding belts, and maintaining tools. The middle pages are con-

(Continued on page 28A)

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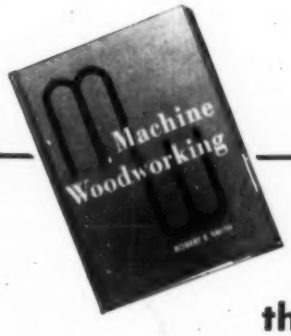

NEW Book of the Month

MACHINE WOODWORKING

By Robert E. Smith

Here's a brand new edition of a widely used text. Smith's **Machine Woodworking** was revised in 1958, bringing it completely up-to-date. Its 202 pages are easy to read, tell WHY. The 365 illustrations show HOW. Its 104 units are organized in logical sequence on the safe, efficient use and care of power tools.. **Machine Woodworking** encourages student self-reliance and self-direction, stimulates him to go ahead "on his own." Makes a perfect textbook or reference.

List price, $3.60

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Understanding Your Car #82	$ 1.60
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A Handbook of Drafting Rules and Principles #73	2.00
Applied Drawing and Design #43	est. 4.00
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Blueprint Reading and Sketching #14	1.00
Graphic Architectural Drafting #60	4.80
Introduction to Applied Drawing #28	1.00
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General Shop Electricity #8	1.50
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Metalwork Technology and Practice #31	4.80
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Designs and directions for 31 attractive projects. Detailed instruction for all operations.

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NEW PUBLICATIONS

(Continued from page 26A)

cerned with historical, geographical, and manufacturing matter.

The rest of the book is devoted to 28 projects and ideas for further leathercraft work. The projects include a combcase, a lady's handbag, a holster, a briefcase, and other such designs. The book is printed in brown ink, symbolizing the leather itself.

The Installation and Servicing of Domestic Oil Burners

By Frank V. Mitchell and Robert W. Mitchell. Cloth, 348 pp., 8¾ by 11 in., illus., $5. Arco Publishing Co., Inc., New York, N. Y.

This book has been written for (1) those who want to become practical mechanics in an expanding, high-salaried industry, and (2) for the layman who owns an oil burner and wants to save money on operation and maintenance. It covers oil burning principles; useful fuel oil information; heating systems; how to figure firing rates; combustion chambers; fuel units-pumps, valves, filters; oil burner wiring; motors, transformers, ignition; thermostats, operating and limit controls; primary controls; oil burner installation; chimney, draft, combustion testing; high pressure, oil-o-matic, GE, vertical rotary, and vaporizing burners; clean-ups and check-ups (all types); and service tips.

A dictionary of terms defines special phrases and describes the essential elements of the serviceman's vocabulary. There are 105 pages of illustrations.

Electrical Equipment Operation and Maintenance Handbook DR-324A

Prepared by Delco-Remy Division, General Motors Corp., Anderson, Ind. Paper cover, 8½ by 11 in., illus., $1. A supplement to the thirteenth edition of Dr-324, this handbook includes service bulletins issued after publication of the thirteenth edition. Bulletins included cover the maintenance and servicing of storage batteries, ignition distributors, a.c. generators, cranking motors, a.c. and d.c. generator regulators, and a.c. generator rectifiers.

Revised editions of the supplement will be issued periodically in order to incorporate the latest changes and information on new electrical equipment.

Vocational Education in the New York City Schools Part I and II

Part I, Report of a Cooperative Study, covers the first 220 pages; and Part II, 222–445 pages; both parts paper covered, 6 by 9 in. Prepared by the New York State Education Department and the Board of Education of the City of New York under the direction of J. Cayce Morrison, coordinator of research, and John J. Seidel, co-ordinator of studies.

Tips to the Handyman-Hobbyist on How to Do It Safely

Paper cover, 46 pp., 3¾ by 8 in., illus. Prepared for the Home Insurance Company, by the editors, Dr. Herbert J. Stack, director of the Center for Safety Education, and Dr. Leon Brody, the Center's Director of Research and Publications, both associated with the Division of General Education, New York University.

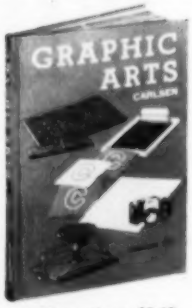
This handy booklet includes valuable tips in the various operations of power tools and hand tools; in woodworking, metalworking, electricity, paints and finishes, cleansing and polishing; basic precautions concerning chimneys; household appliances; heating, cooking, and hot water equipment; plumbing; home basements; tips around the garden and the

BENNETT BOOKS FOR THE SCHOOL SHOP...

New...

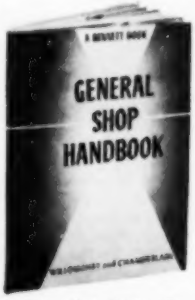
GRAPHIC ARTS

By Darvey E. Carlsen



Easily-understood introduction to every phase of graphic arts. Text and numerous photos guide students through actual projects, providing a broad knowledge of fundamentals. (To order circle No. 1)

160 pages; 383 illustrations. $3.60



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grounds; radio and TV installations; guns and ammunition; your darkroom; cutting and handling of glass; fire precautions for the homeowner; and a final tip on leaving some home jobs for the professionals.

Basic Electricity

By Abraham Marcus. Cloth, 493 pp., 6⅛ by 9¼ in., illus., $4.85. Prentice-Hall, Inc., New York, N. Y.

This book on the fundamentals of electricity is intended for the beginning student. The book which is divided into six parts, discusses the theory of electricity, the direct-current phenomena, alternating current, generators of electricity, practical applications, and measuring instruments. One section is devoted to electronics and the practical applications of the electron tube. There are numerous drawings and photographs, a glossary of electrical terms and symbols, a glossary of electrical formulas, a mathematical table, and tables of measurement.

Planned Training — Your Future Security

Paper, 4¾ by 7¾ in., illus., free. Bureau of Apprenticeship and Training, U. S. Department of Labor, Washington 25, D. C.

Preparation for craftsmanship in the skilled trades is discussed in this booklet published recently by the U. S. Department of Labor Bureau of Apprenticeship and Training.

Directed to high school students and counselors, the booklet stresses the importance of education and sound training in developing successful careers in industry.

An explanation of apprentice training and its advantages to young people in equipping them for craftsmanship in the skilled trades; qualifications for apprenticeship; choosing a trade; and where to apply for training are covered in the booklet.

Man, Metals and Modern Magic

By J. Gordon Parr. Cloth, 238 pp., 5¾ by 7⅞ in., illus., $2.95. American Society for Metals, Cleveland, Ohio.

This is an extremely interesting book on what metals did to man, and what man did to metals. It is written by a man who is well versed in metallurgy, and is a professor teaching that subject.

The book contains 13 chapters in which the author discusses metallurgy from the years 4000 B.C., to A.D. 1850; also Arab alchemy, the new enterprises, aluminum, iron and steel, alloy steels, the superalloys, and new metals and alloys.

He also has a chapter on the fabrication of metals and alloys, and another on the metallurgical science in the twentieth century.

Coalmining

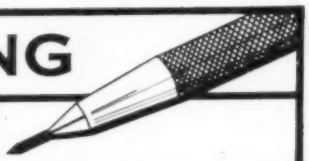
By I. C. F. Statham. Cloth, 564 pp., 6⅝ by 8 15/16 in., illus., $15. Philosophical Library, New York, N. Y.

This is a comprehensive text on the subject of coal mining which emphasizes the understanding of the practical work which the beginner must have when he undertakes to enter this field of work.

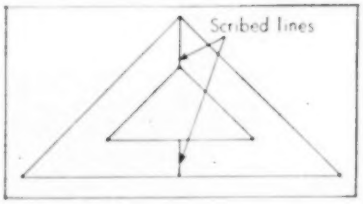
The 18 chapters into which this book is divided present the subject under the following headings: coal mining in the life of the nation; the origin and occurrence of coal; the planning of a colliery; colliery surface plant; shaft and shaft-bottom arrangements; organization, administration, and personnel of the mining industry; winning and working the coal; at the coal face; support of mine workings; underground transport; the ventilation of a colliery; mine lighting and drainage;

(Continued on next page)

DRAFTING TIPS



Drawing perpendiculars

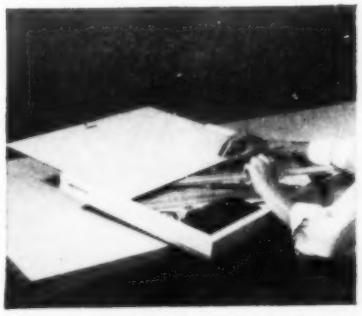


Drawing perpendiculars to a line on a drawing that is not horizontal or vertical can be tricky. An easy and accurate method is to scribe a line perpendicular to the long edge of a triangle. The long edge can then be placed accurately on the already-drawn line, and a point marked to locate the perpendicular.

New drawing board—carrying case combination

With the new Post Porta-Draft, the student can easily carry everything he needs for drafting. The drawing board with metal edges, 20″ x 26″, is Post's best quality basswood.

Behind the board is a large storage space covered by a sliding panel. In this area, the student has plenty of space for instruments, T-squares, scales, triangles, curves and all the other supplies necessary for classroom drafting. There is even enough room for a textbook.



At the end of the class, the student is ready to carry all his supplies home. The Porta-Draft is also ideal for rack storage in crowded classrooms.

The Porta-Draft is made of smooth, clear top-quality basswood throughout. Two edges of the board (front and back as board is carried) are metal edged for protection against damage.

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NEW PUBLICATIONS

(Continued from previous page)

power at collieries; and safety and health in the mining industry.

Bridges and Their Builders

By David Steinman and Sara Ruth Watson. Paper, 401 pp., $1.95. Dover Publications, Inc., New York 10, N. Y.

A bridge builder tells here the epic of the bridge — that early invention of man which shares with the wheel, the arch, the steam engine, the electric motor, and other basic inventions — the credit for the development of human transportation. The senior author is an eminent engineer and his associate is also experienced. They tell here the history of the science and art which they practice and they make clear not only the romance and the technology of various types of bridge design, but they make clear that bridge design and building are still developing and growing and have a vast future ahead.

Descriptive Material

WOODCARVING TOOLS AND BOOKS

Frank Mittermeier have announced their new illustrated catalog showing 1001 different tools sold individually and in sets. School shops, institutions, art schools, sculptors, etc., will be interested in the latest type chisels, gouges, parting tools in straight, long bend, spoon, back bend, and fish tail shapes. Many special and hard-to-get items are available. Catalog is available free.

(For further details encircle index code 0718)

STARRETT COMPANY BULLETINS

Bulletin No. 1069, issued by The L. S. Starrett Company, describes new Starrett Safe-Flex High Speed Steel Band Saws, and gives recommendations for use and specifications covering the blade sizes and pitches available in hook-tooth, regular, and skip-tooth types.

Bulletin No. 1110 describes new Starrett No. 498 Free Machining, Low Carbon Precision Ground Flat Stock, lists the many sizes available and gives suggestions for use, specifications and heat treatment instructions.

(For further details encircle index code 0719)

IRON BENDING MOVIE

"An Introduction to the Hossfeld Bender" is a 20-minute, 16mm., color-sound educational film describing the problems encountered in custom bending, and how they can be solved. It is available on loan from the producer, Hossfeld Manufacturing Company.

It deals with the bending of angle iron (flange in or out), flatstock (flatways or edgeways), conduit (rigid or thinwall), plus rounds, squares, pipe and tubing.

The 800-ft. movie, produced by professionals, shows the Hossfeld Universal Iron Bender in operation demonstrating the various bends met with everyday in custom, maintenance and limited production work as found in metalworking, custom welding and repair shops, industrial and enginering plants, institutions, and vocational departments of colleges, universities, trade, and high schools.

(For further details encircle index code 0720)

NEW BOOKLET ON SELECTION OF FILMS

Eastman Kodak Company has announced the publication of a new booklet containing data needed to select the proper 16mm. Kodak movie film for every type of job. It answers the need for this type of information of the professional who makes movies for industry, science, sports, and education as well as the amateur who makes movies solely for home use.

This booklet, "16mm. Kodak Movie Films — Data and Selection," tells when and why to use reversal or negative type film, color or black-and-white movie film, and provides advice on loading, film storage, processing, duplicating, and the use of magnetic sound coating, in addition to other valuable data.

(For further details encircle index code 0721)

"PLANNING YOUR SCHOOL SHOP WITH CHALLENGE EQUIPMENT"

The Challenge Machinery Company have issued a new 28-page booklet on planning the school printing shop.

The booklet is intended as a helpful aid to school administrators or shop teachers planning new graphic arts shop facilities or expansion of present ones. Included is complete descriptive information on the models of Challenge Paper Cutters, Proof Presses, Paper Drills, and Composing and Lock-Up Equipment best suited to school shops.

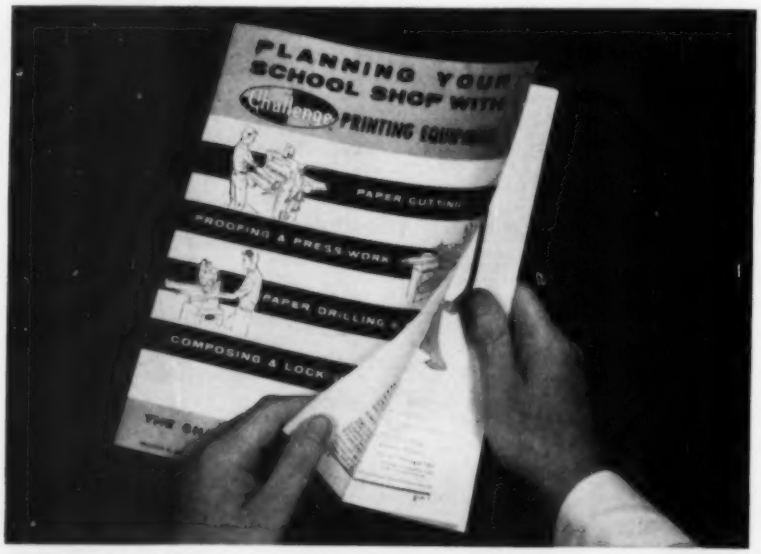
Introducing each section of the booklet is a page of helpful selection information and a discussion of the various models.

Copies of booklet available by asking for Publication 609.

(For further details encircle index code 0722)

(Continued on page 32A)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION



NEW BOOKLET

HELPS YOU PLAN AND IMPROVE YOUR SCHOOL PRINT SHOP

Here is a helpful aid to school supervisors, shop instructors, and others interested in planning new graphic arts departments or expanding present facilities.

This booklet provides a useful guide to the selection of the most practical paper cutting, proofing, paper drilling or punching, composition and lock-up equipment, and supplies for school print shop needs. Mail coupon for your free copy of this booklet.

SCH-101

Challenge

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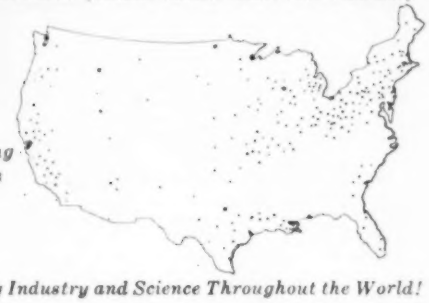
Industry strongly urges school training on drafting machines for all mechanical drawing students! Universal Desk-Topper drafting machines are specially designed and budget priced for school use . . . precision-engineered to professional standards. Send for free technical text giving you full information for proper instruction. (Include school name and address.)



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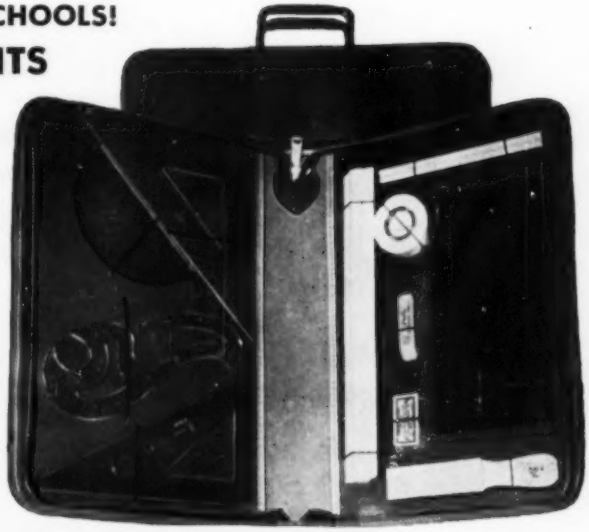
All needed drafting tools combined in this one easy-to-carry case! Students come to class fully equipped, don't have to beg the loan of a protractor, a triangle or scale. Sessions get under way promptly! Instructors in hundreds of schools say it's today's indispensable teaching aid. Tell your students about it.



YOUR CHOICE OF 8 DIFFERENT DRAWING SETS — PLUS

Protractor	French Curve
Engineer's Scale	Draftsman's Tape
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8" Triangle (45°-90°)	2 Drawing Pencils
10" Triangle (30°-60°)	2 Erasers

Berger Drawing Set #510 plus complete kit: $10.50

All in attractive, durable, 12" x 16" 3-way zipper carrying case of scuff-proof, waterproof Texon with slide-in handles. Inner compartments for papers. Opens to 16" x 24".

PRICES FOR COMPLETE KITS: $7.86 to $18.90

New Economy Size Porta-Draft Kits From $5.58

Choice of Drawing Sets . . . *PLUS*

Protractor	French Curve
12" Triangular Scale	Pencil Pointer
6" Triangle (45°-90°)	Drawing Pencil
8" Triangle (30°-60°)	2 Erasers

In handy 10" x 14" zipper carrying case of Texon. Two inner compartments for note papers. Opens to 14" x 20".

Prices quoted are for 6 or more kits. Instructors may buy sample kit at same low price.

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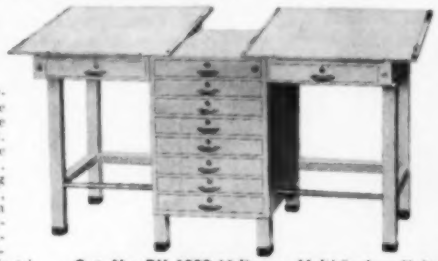
FLEX-MASTER Multi-Student

INDIVIDUALIZED DRAWING UNITS

Provide horizontal storage space for drawing boards & personal tools

Here are drawing surface, reference surface and private storage space for each student. Drawers have separate locks, masterkeyed . . . hold individual drawing boards up to 20" x 26", horizontally, with room for T-square, instruments and other material. Space-saving economical, efficient. Students' work is undisturbed between classes, no need to re-set up material. Individual expression . . . unhurried work is encouraged.



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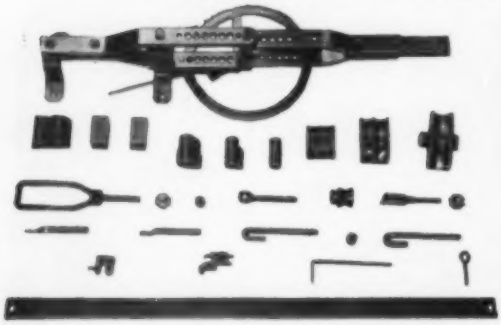

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5 REASONS WHY:

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DESCRIPTIVE MATERIAL

(Continued from page 30A)

NEW CHALLENGE PROOF DRYER

A new radiant heat Proof Dryer that dries proofs quickly, without scorching, is described in a new 4-page folder that has just been released by The Challenge Machinery Company.

Both 17 by 22-in., and 20 by 26-in. models, as well as the cabinets for these units, are described in the folder.

Write for Publication No. 743.

(For further details encircle index code 0723)

IMPROVED H MODEL PAPER CUTTERS

Publication No. 635, put out by The Challenge Machinery Company, is a new 8-page descriptive booklet covering the latest Challenge Power and Lever Paper Cutters in sizes 19 in., through 30 in. Included is complete descriptive information on the features of each of the ten different models with a handy comparison chart of features. Also information on such handy accessories as split back gauges and false plate clamps.

(For further details encircle index code 0724)

BRUNING'S NEW BOOKLET

A new, 12-page illustrated booklet describing the Copyflex Diazotype Reproduction Process is available free of charge from the Charles Bruning Company.

The booklet explains the various types of direct-positive prints possible with Copyflex, including black-line or color-line prints on white or tinted stock; multi-color films for projection and overlays; translucent duplicate originals; dimensionally stable film and glass cloth prints; and reflex prints on translucent film. It also explains how the Use of Copyflex reproducible reproductions (intermediates) can save time, expense, and work in engineering, drafting, and reproduction departments. Nine models of Copyflex machines are described.

(For further details encircle index code 0725)

NEW CLOCK CATALOG

The Standard Electric Time Company has issued a 20-page two-color catalog covering its clock and program systems for use in schools, colleges, institutions, and wherever signals must be programmed to sound on schedules. Described are Standard's two types of systems, one utilizing synchronous motor powered secondary clocks, the other incorporating secondary clocks of the minute-impulse type. Both systems feature simplified programming and automatic resetting of secondary clocks.

Also included are Standard bell control boards, various types of signals and individual clocks (with and without automatic reset features) for both system and individual operation.

All components of the system are illustrated and described; specifications and over-all dimension diagrams for all are included.

The new catalog also contains typical job specifications for both types of systems.

(For further details encircle index code 0726)

NEW PUBLICATIONS FROM SAMS

Howard W. Sams & Co., Inc., announce the following new publications, available immediately.

Replacement Guide for TV Controls. (Cat.

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NEED SCHOOL SHOP LUMBER TO START FALL TERM?

WE CAN GIVE YOU *QUICK SERVICE!*

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HARDWOOD CORPORATION OF AMERICA

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P. O. Drawer 1091, ASHEVILLE, N. C.

No. RGC-1) Easy-fold binding, 8½ by 11 in., 112 pp., list price $1.

Completely new and different, it covers the currently available replacement controls for over 18,000 models of TV produced since 1946. An exclusive new Industry Number system offers easy selection of the proper and recommended replacements of these four replacement control manufacturers: Centralab, Clarostat, IRC and Mallory. This guide was produced at the suggestion of these manufacturers and with their full co-operation.

Servicing Transistor Radios. (Cat. No. TSM-1) 152 pp., 8½ by 11 in., list price $2.95.

It provides essential information on the latest model transistor radios and their servicing. Complete Photofact coverage of 70 models of current transistor receivers includes the new General Motors' (Delco) auto-portable radio. Full information includes schematics, alignment instructions, photo views of each chassis, complete parts lists, and replacement data.

Industrial Sound Systems. (Cat. No. ISS-1) 276 pp., 5½ by 8½ in., list price $3.95.

This book gives valuable up-to-date coverage of the subject needed by those interested in the planning, selection, operation or maintenance of such equipment.

Sound and intercom system requirements for factories, theaters, schools, offices, stadiums, trains, etc., are fully described.

Tape Recorder Manual, Vol. 2. (Cat. No. TR-2) 160 pp., 8½ by 11 in., $2.95.

This new series is being produced to meet the increased demand for more comprehensive material on current-model tape recorders.

Volume 2 covers a basic tape recorder chassis and one stereophonic tape player chassis produced in 1957—a total of 16 models. Both home and professional type tape recorders are covered. Complete authoritative information includes general operation data, use of external speakers, mechanical and amplifier adjustments, cleaning, lubrication, etc. Photos show actual recorder, and amplifier. Exploded view drawing gives complete assembly and parts list information. An invaluable book for technicians or audiophiles.

TV Signal Distribution and Antenna Techniques. (Cat. No. DSB-1) 186 pp., 5½ by 8½ in., list price, $2.95.

This book was produced to answer the increasing demand for information concerning the problem of supplying an efficient TV signal to two or more TV receivers.

Every type of TV signal distribution system is fully explored to give the service technician complete information on profitable installations required by hotels, apartments, motels, offices, stores, trailer parks, institutions, etc. A complete section explains requirements of long-line or community antenna systems. Every problem from the initial installation of an antenna system to the final trouble-shooting and maintenance is covered. Additional sections provide information on bidding, cost estimating, and selling such installations.

Sold nationally through electronic parts distributors, or write to Howard W. Sams & Co., Inc.

(For further details encircle index code 0727)

COMPANY CHANGES NAME

Effective April 28, 1958, Sterling Wheelbarrow Company has changed its name to Sterling National Industries, Inc.

Current plans call for no change in corporate structure or policies. The company will continue to furnish the same quality products that have become associated with the name *Sterling* for more than fifty years.

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HEAT TREATING TEACHING AID

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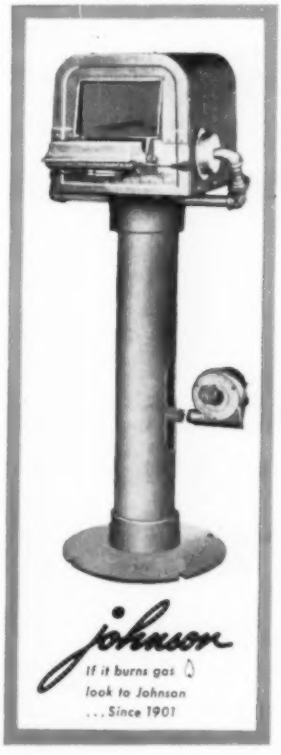
No. 120 furnace heats to 1500° in 5 minutes . . . saves time in the shop



No long waiting for warm up when you instruct heat treating with a powerful Johnson No. 120 Hi-Speed Furnace. Heats 2300° in 30 minutes, temperature easily adjusted for carbon and high speed steels, tools, dies, and small metal parts. Economical operation with natural, mixed, artificial or bottled gas. Complete with Carbofrax hearth, G.E. Motor and Johnson Blower. Firebox 5" by 7¾" by 13½". 120,000 BTUs per hour maximum. $184.00 F.O.B. Factory.

Write for FREE JOHNSON CATALOG
plus information on factory reconditioning your present Johnson Furnaces.

JOHNSON GAS APPLIANCE COMPANY
585 E Avenue N.W., Cedar Rapids, Iowa

SHOP EQUIPMENT NEWS

(Continued from page 47A)

cut best at 40 f.p.m. The wide speed range is obtained with a standard, low-cost 1725-r.p.m. motor and without belt changes.

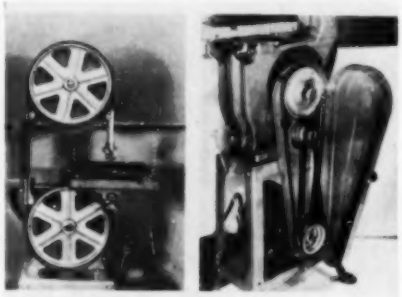
Because a standard motor is used, initial cost is lower, motor replacement is no problem, and all the service problems connected with special, slow-speed motors are eliminated.

A bull gear free-wheeling on a double-row ball bearing provides the overriding feature in direct drive, which eliminates the necessity for changing V belts throughout the entire 75-to-1 speed reduction range. Torque reduction and multiplication are achieved by using step pulleys and gear box. The gear box alone provides a 55-to-1 reduction or multiplication.

All gear shafts are mounted on sealed-for-life ball bearings, and gears operate in an oil bath within a totally enclosed housing.

For further information write to Delta Power Tool Division.

(For further details encircle index code 0708)



New Rockwell-Delta Wood Metal Band Saw

SILENT STOCK TUBES

Brown & Sharpe Mfg. Company are offering silent stock tubes in seven sizes, for their Automatic and Hand Screw Machines. When the ordinary stock pipe is replaced with a Brown & Sharpe Silent Stock Tube, objectionable noise created by the rotation of stock is eliminated. With the noise level considerably reduced, working conditions are greatly improved with a resultant increase in production.

Silent Stock Tube

Using a Brown & Sharpe Silent Stock Tube, the bar rotates in a helically wound, wear-resistant steel liner that has no sharp edges to damage stock. This ability to handle stock of either round or irregular cross section without marring is an important advantage, and is especially so where the bar being used is an expensive extruded shape. They accommodate round, hexagonal, square, or irregular shaped stock up to the capacities of the machines.

The liner in this stock tube is open at both ends and is surrounded with sound-absorbent packing within a steel outer tube. This construction deadens sound and prevents the transfer of vibration.

Conversion brackets for adapting Brown & Sharpe Silent Stock Supports to accommodate these Silent Stock Tubes are available.

(For further details encircle index code 0709)

ALLIED KNIGHT-KIT PORTABLE RADIO

Allied Radio Corporation announce the release of their new Knight-Kit 5-Transistor Portable Radio in kit form. Supplied with

Knight-Kit 5-Transistor Portable Radio

(Continued on page 36A)

BIG,

POWERFUL 10" SAW

Gets almost double work surface from solid table extensions: over 25" in front of blade with mitre gauge extended. Rips 3 1/8" stock with blade at 90°. The only 10" tilting-arbor circular saw using standard NEMA frame motor, up to 3 HP: more production, no vibration, no kickbacks.

$259

LESS MOTOR, SWITCH AND EXTENSIONS

12" LATHE

18"x6" SURFACER

8" JOINTER

20" BAND SAW

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Dept. I 723 Fourth St. Beloit, Wis.

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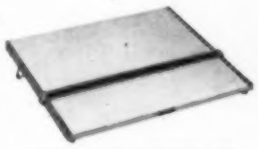

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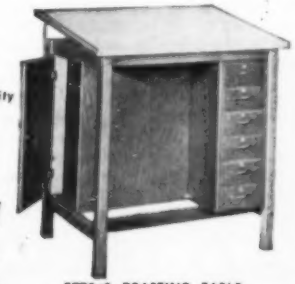

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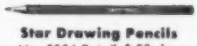
If you buy or specify drafting materials and drawing instruments, write for this handy Ready Reference Chart with convenient decimal table. Here's a fully illustrated Reference Chart showing the complete Alvin line. Makes a handy buying reference for mechanical and architectural drawing teachers. Can be tacked on a wall for students' reference. For your free copy write to Alvin . . . . Today!

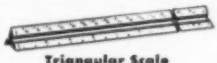
HERE'S A FEW OF OUR STUDENT SPECIALS



Star Drawing Pencils
No. 5054 Retail $.90 doz.

"T" Square
No. C-18 — Retail $2.75

Basswood Drawing Board
No. DB111-Retail $1.90



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SHOP EQUIPMENT NEWS

(Continued from page 34A)

all parts, the kit package includes a compact ivory-and-black plastic case, with gold-finished metal end plates and pull-out carrying handle.

The orderly chassis layout, plus the use of a printed circuit board, provides easy accessibility to all parts and the battery. Additionally, the printed circuit board simplifies and speeds assembly for the kit builder, and eliminates chance of wiring error.

Other distinguishing features of the Knight-Kit portable radio kit are: a larger-than-average, 3½-in. speaker for clear tonal quality; superhet circuit employing 5 transistors; Class B push-pull audio output stage for clean reproduction and low battery drain; high gain built-in ferrite loopstick antenna; and phone jack output for private listening if desired.

The Allied Knight-Kit 5-Transistor Portable Radio Kit is supplied complete with all parts, wires, solder, battery, and instructions.

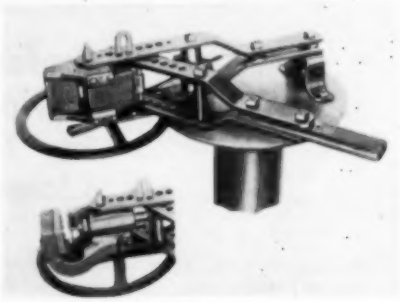
Further details are available.

(For further details encircle index code 0710)

HOSSFELD SHEAR AND PUNCH ATTACHMENTS

Two new attachments to further the versatility of the Hossfeld Universal Pipe, Bar and Angle Iron Bender are being introduced by Hossfeld Manufacturing Company.

The Shear attachment is extremely useful in shops that cut flats as well as rounds. Blades are adjustable and interchangeable, of high grade tool steel hardened for cutting hot rolled mild steel or its equivalent. Capacities are ⅜ by 2-in., flats and ½-in. round or square stock.



Punch Attachment Setup (inset) and Shear Attachment on Hossfeld No. 2 Universal Iron Bender

The Punch attachment is ideal as a utility punch for short run jobs. It is fitted with a standard Cleveland coupling nut (size No. 7, style 23) for standard punch dies. A set of punch dies is furnished with each attachment in any size from 3/16 in., through 9/16 in., in increments of 1/16 in. Special sizes can be furnished on request.

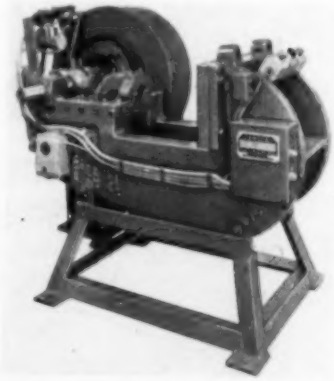
The Shear and Punch attachments feature quick and easy setup. They are two of 143 different dies that make the Hossfeld the most versatile of all benders. For maintenance and limited production work it has no equal. It is indispensable in metalworking, custom welding and repair shops, industrial and engineering plants, institutions, and vocational departments of colleges, universities, trade and high schools.

Illustrated literature on the Hossfeld Bender showing samples of bar, angle iron and pipe bending, and dies available, may be had by writing.

(For further details encircle index code 0711)

HORIZONTAL 30-TON PRESS-RITE PRESS

Press-Rite Division of Sales Service Machine Tool Company have recently introduced a new horizontal 30-Ton Press-Rite O.B.I. Press.



Horizontal 30-Ton Press-Rite Press

A new fabricated steel base provides a solid footing for mounting the press horizontally. The motor mount is built onto the base

(Continued on page 38A)

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CONGRATULATIONS

TO THE PRIZE WINNERS IN OUR

Olde Thompson®

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FIRST PRIZE—$100 GOVERNMENT SAVINGS BOND

Student: David Remington
Instructor: Mr. E. A. Hickson
Capuchino High School, San Bruno, California

SECOND PRIZE—$50 GOVERNMENT SAVINGS BOND

Student: Dick Weary
Instructor: Mr. Harold L. Lesher
Senior High School, Carlisle, Pennsylvania

THIRD PRIZE—$25 GOVERNMENT SAVINGS BOND

Student: Stephen Allen Fields
Instructor: Mr. A. E. Price
King City Joint Union High School, King City, California

HONORABLE MENTIONS

Student	Instructor	School
Faye Wells	Z. Joe Buckley	Tucumcari Jr. High School, Tucumcari, New Mexico
Jerry L. Robinson	William Waytulonis	Marine City High School, Marine City, Michigan
Mike Pettingill	Arlo Felix	Ben Lomond High School, Ogden, Utah
Randy Cullen	Robert Thom	Acalanes Union High School, Lafayette, California
Melvin Schmierer	Ben Solover	Galt Joint Union High School, (Lodi-Acampo), California

To the thousands of entrants and their instructors, our sincere thanks for your participation. The terrific response to this contest suggests that here is a school shop project deserving of your interest.

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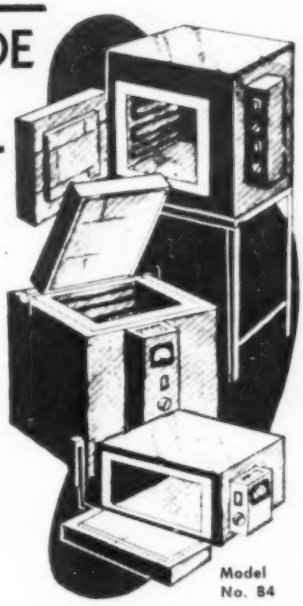

Model No. 84

STEWART CLAY COMPANY'S— Craftkiln
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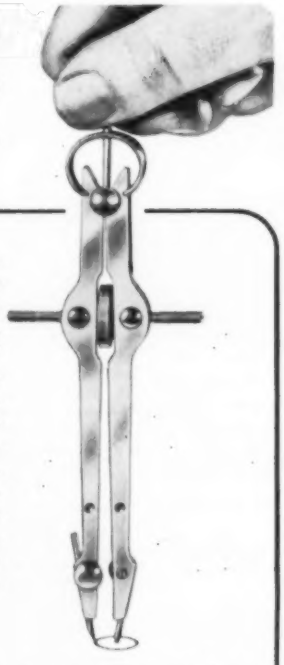

Here is a simple, effective test to show whether or not a compass has the strength and rigidity necessary for the "heavy-duty" demands of modern drafting-room practice. Draw black circles one-half inch in diameter with hard lead in compass, applying heavy twisting pressure. The legs must not twist. Precision made VEMCO compasses pass this test perfectly, because of their welded steel construction, and unique "OPEN-TRUSS" design.

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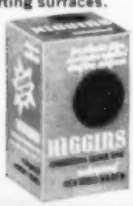

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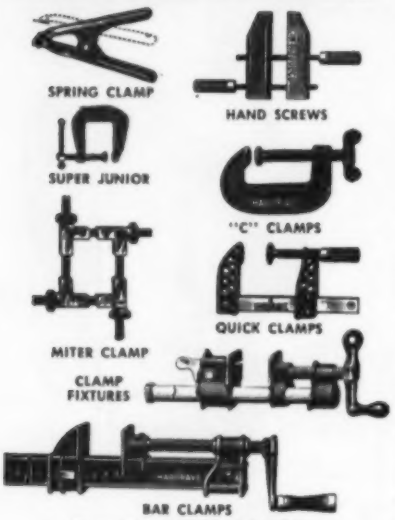

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Brantford, Canada

SHOP EQUIPMENT NEWS

(Continued from page 36A)

and provided with a screw adjustment for belt tension. The operating controls are conventiently placed at the front of the machine.

Complete information is available.

(For further details encircle index code 0712)

NEW VISUAL INSTRUCTION TECHNIQUE

The Charles Beseler Company have introduced a startling technique in visual instruction. Beseler's "Clear-A-Slide Kit" enables teachers, lecturers, and others to make color transparencies and project them immediately. The fully equipped kit is available in four sizes from 3¼ by 4 in., to 10 by 10 in.

Clear-A-Slide Kit

Beseler's "Clear-A-Slide Kit" makes it possible to prepare full color transparencies quickly and easily by just using pencils. Specially treated vinyl slides are used. The writing is made permanent, fade-proof, and smudge-proof by spraying the vinyl slides with a special "Clear-A-Slide" Spray. The spray dries in a moment and the slide is ready for projection.

The kit includes the spray can, layout pads with grid lines, 12 pencils, including black, green, blue, orange, red, yellow, an eraser, lint brush, 25 vinyl sheets, and container. Lecturers can custom-make "Clear-A-Slides" when and how they are needed and to the desired size. It is designed to use with overhead projectors (Vu-Graph).

Further information is available from Beseler.

(For further details encircle index code 0713)

NEW PRINTED CIRCUIT HOLDER

Wilton Tool Mfg. Co., Inc., have developed a new adjustable combination chassis and work positioner for holding printed circuits during assembly of component parts. The new PowRarm plus Circuit Holder combination is not only more versatile and less expensive than custom tooling, but also ends the awkward and time consuming practice of manhandling work pieces.

The PowRarm, or work-positioner part of the tool, facilitates positioning in any plane of a half sphere, with instant locking at the desired angle, giving the operator convenient access to the work piece at all times. Attached to the standard PowRarm is Wilton's new Printed Circuit Holder designed for swift loading and unloading of printed circuits during assembly operations.

The circuit board is quickly inserted in the two machined notches of the top clips. The

(Continued on page 40A)

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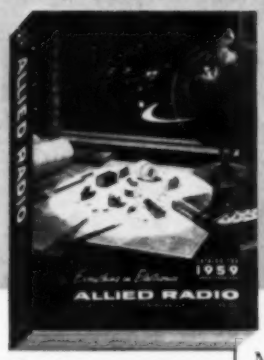
everything in electronics for the SCHOOL



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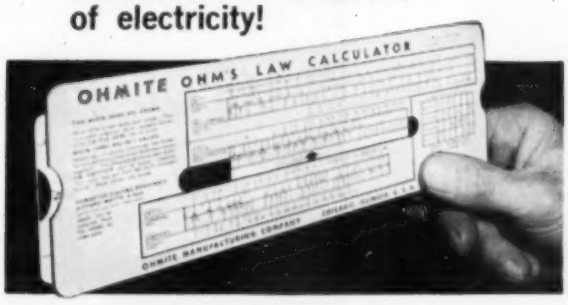

OHM'S LAW Calculator and Slide Rule

A time-saving calculator for your students after they have learned Ohm's Law. Solves Ohm's Law and many parallel resistance problems simply, quickly, accurately—with only one setting. Slide rule scales multiply, divide, find squares, square roots, etc. Only 9" x 3", heavily varnished cardboard, it fits conveniently into the pocket. Also available in durable vinylite at $1.50.

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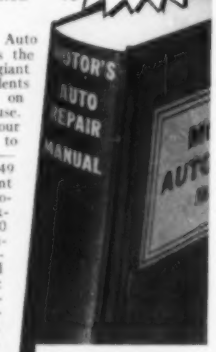

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SHOP EQUIPMENT NEWS

(Continued from page 38A)

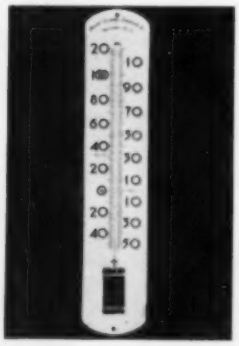
Printed Circuit Holder

clips are automatically raised with the board, and the board is dropped into the two slots at the bottom points of contact. For unloading the operation is reversed. Both the width and the height of the holder are adjustable for use with subassemblies of varied dimensions. The width is adjustable from 7½ to 14 in., and the height from 2½ to 6½ in. The holder has to be adjusted only once, for any given work piece.

(For further details encircle index code 0714)

MULTI-PURPOSE THERMOMETER

General Scientific Equipment Company have announced a new multi-purpose thermometer which offers easier, faster, and more accurate readings. Known as Model No. 2900, this general purpose instrument is one of the most readable thermometers on the market and has many industrial applications.



Model No. 2900
Multi-Purpose Thermometer

It is made of heavy metal with black figures 7/16 in. high, on a white background, and is designed with a magnifying red lens tube, offering easy reading at a glance from a distance.

The total length is 14 in., by 2½ in. wide. Scale range is minus 50 to plus 120 deg. F., and it weighs 10 oz. The bulb chamber is protected against breakage. Eye at top and bottom provides easy mounting. Ideal for room or cold storage.

(For further details encircle index code 0715)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

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REPLACEABLE BLADE X-ACTO KNIVES

X-acto, Inc., producers of industrial and hobbycraft tools, have found that the replaceable blade knives are proving their versatility in increasing numbers of silk screen shops and studios, where they are being used for stencil, frisket, and cardboard cutting.

Karl Korneth of Karl Korneth Silk Screen Reproductions, New York City, commercial silk screen shop, cuts stencil for color change on advertising display card using X-acto replaceable blade knife. He has been using the same knife daily for more than twelve years

Finely ground carbon steel blades assure a sharp, clean cut every time. Changing the inexpensive blade is accomplished in seconds and has been found to be far easier and less costly than sharpening nonremovable blades. Distinctively shaped blades made by the firm for specialized work are rapidly fitted to a standard X-acto knife handle.

Handles are made of sturdy, lightweight aluminum. Each is fitted with a precision locking chuck that holds blades securely during all cutting operations. A twist of the knife's knurled collar loosens the chuck for instantaneous blade replacement.

Knives and blades are obtainable at art supply and hobby shops nationally. Additional information may be obtained from X-acto, Inc.

(For further details encircle index code 0716)

CRAFT METALS AND SUPPLIES

St. Louis Crafts, Inc., suppliers of craft metals and materials since 1949, have available their complete line of Maid-o'-Metal products of interest to teachers, craftsmen, and hobbyists.

Maid-o'-Metal craft metals and supplies are carefully prepared and selected to suit the requirements for the crafts and hobby processes developed and commonly used by women's clubs, schools, institutions, recreational and hobby groups engaged in making metal trays, plaques, pictures, planters, jewelry items, etc.

Of guaranteed quality and subject to these relatively simple processes, Maid-o'-Metal products bring ease and assurance to your craft projects.

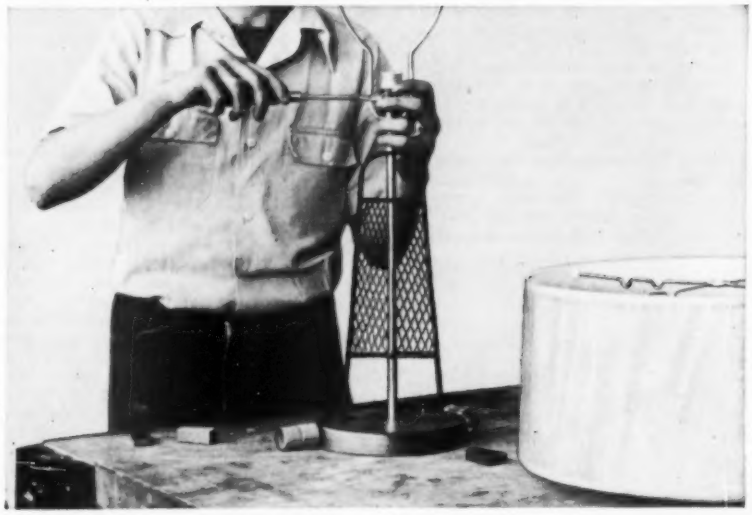
New items now available include bracelet blanks in several styles and sizes, bracelet bender, flat circles in various gauges and sizes, preformed circles, colored finishes (anodized), trays and individual designs for etching, new aluminum tray handles, the wiggle-engraver, and modeling tools of genuine boxwood in 6-in. length particularly well suited for tooling aluminum, brass, and copper foils.

Further information available.

(For further details encircle index code 0717)

This lamp-making project

teaches two lessons



How to make a lamp is just one of the things students learn from this project. . . . Another is how to make a lamp that is also an *efficient lighting instrument*. Such a lamp must be designed with the user and the use in mind, so that it provides sufficient, glare-free light, properly distributed, for the user's needs.

For instance, to make a *table* lamp that does an effective lighting job, you will find this simple equation valuable:

From the average eye-level height of a seated person (40"), subtract the average end table's height (24"). The difference – 15" – is about what this lamp should measure from the table to shade bottom.

This and other valuable lamp-making facts are part of the program, "Working with Light." This program –which helps you teach "the facts of light"– was prepared by the Better Light Better Sight Bureau after consultation with representatives of the National Education Association and others prominent in the field of industrial arts and vocational education. Specially designed for high school and junior high school industrial arts classes, this program includes a 116-page Lighting Handbook, 12 Project Leaflets and a student Reference Folder.

FREE AIDS. A complete package of "Working with Light" materials will be sent to shop teachers *without charge* in areas where there is a Better Light Better Sight Bureau sponsor. (We will check our sponsor list for your area.) To get your materials, fill in and mail the coupon *today*.

Better Light Better Sight Bureau, Dept. IA-v
P. O. Box 393, Great Neck, N. Y.

Please send me free "Working with Light" teaching aids.
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I am a: College Student ☐ Other _____

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Shop Equipment News

STANLEY DRILLS AND DRIVERS

Stanley Electric Tools, Division of The Stanley Works, presents a complete new line of drills and power drivers simultaneously to the hardware, building and industrial trades, and to the schools.

The line, with distinctive advanced industrial design, includes two ¼-in. heavy-duty drills, two ⅜-in. heavy-duty drills, one ¼-in. standard duty drill and drill kit, and six heavy-duty impact type power drivers.

All ampere ratings on these tools are *industrial* ratings.

All the heavy-duty drills have precision-sealed ball bearing construction designed for continuous operation and production drilling with lifetime lubrication for cool performance. All drills have control hardened gears and capsule type brushes for extra long life, the new precision three-jawed geared chuck that bites but leaves no mark, and the nonslip pistol grip and grooved housing that offers three-position drilling. Self-contained trigger switch has locking pin at the base of grip. All drills are equipped with three-conductor cords for grounding safety and heavy-duty molded rubber cord protector.

Drills and Power Drivers approved for industrial use

Drills range in speed from 500 r.p.m. (⅜-in.) to 1100 and 1600 r.p.m. load speed (¼-in.).

The heavy-duty impact-type power drivers designed and engineered for powerful, controlled driving of fasteners, feature controlled pressure that engages impact action and insures positive tightness of screws and nuts.

These precision sealed ball-bearing power drivers with modern functional design for easy freehand driving in even the tightest places, contain all the fine features found in the drill line and are introduced as the lightest, most compact, easy-to-handle power drivers in their class at the lowest price on the market today. They come in all speeds — from 375 to 1100 r.p.m. load speed for all driving needs — wood, lag, self-tapping and machine screws and nuts. Power driver accessories available are standard ¼-in. hexagon drive, slotted bits, Phillips bits, socket head bits, extensions, bits with finder sleeves and sockets.

(For further details encircle index code 0701)

Your students learn ELECTRONICS faster with EICO

KITS & INSTRUMENTS

EICO KITS are top-quality professional TV/radio/electronic test instruments — embody latest performance-proven design and circuitry. Complete with all components, pre-punched chassis, deep-etched aluminum panel, rugged steel case — plus pictorial diagrams, schematics, data on color codes, soldering, tools. "Beginner-Tested" step-by-step instructions help the student learn by "doing it himself"—quicken his familiarity with the construction, operation and maintenance of electronic instruments. Used by leading vocational schools, colleges, and universities throughout the U.S. and the world.

5" Push-Pull Oscilloscope #425 KIT $44.95 WIRED $79.95

Vacuum Tube Voltmeter #221 KIT $25.95 WIRED $39.95

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1000 Ohms/Volt Multimeter #536 KIT $12.90 WIRED $14.90

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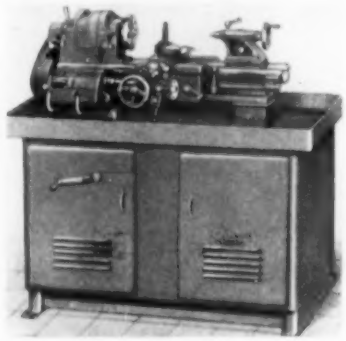
SOUTH BEND 10-IN. PRECISION BENCH LATHE

South Bend Lathe Works offers an improved line of 10-in. swing Precision Lathes. New design features have been incorporated into the gear box, carriage, bed and tailstock to provide greater accuracy, durability, and convenience. Both bench and floor models are made in several bed lengths and are supplied with either engine lathe or toolroom lathe equipment.



South Bend 10-in. Precision Lathe

Thread cutting range has been increased to 70 pitches, 4 to 480 per inch including all standard pitches 4 to 80 as listed in National Bureau of Standards Handbook H28. Also included are 11½ and 28 pipe thread, 4, 6, and 7½ fire hose coupling thread, 30 instrument thread, and fine pitches up to 480 per inch for watch and instrument work. Metric thread cutting equipment can be supplied. The double tumbler gear box also provides instant selection of 70 power longitudinal turning feeds and 70 power cross-feeds. An improved lever operated clutch permits instant engagement or disengagement of power feeds.

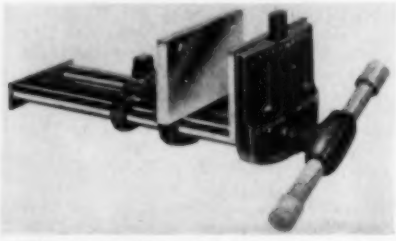
For greater convenience and ease of operation, the apron handwheel has a swivel machine handle and the cross-feed screw is fitted with ball thrust bearings. Both the cross-feed screw and compound rest screw have large diameter satin finished chrome micrometer collars with widely spaced easy reading black graduations. Carriage dovetails are fitted with adjustable tapered gibs. Hardened and ground bed ways and hardened and ground cross-feed screw are optional.

Additional information about the improved 10-in. swing South Bend Precision Lathes is available.

(For further details encircle index code 0702)

NEW LINE OF WOODWORKERS' VISES

The Columbian Vise & Mfg. Company have announced their new line of woodworkers'



Columbian's New Woodworkers' Vise

(Continued on page 44A)

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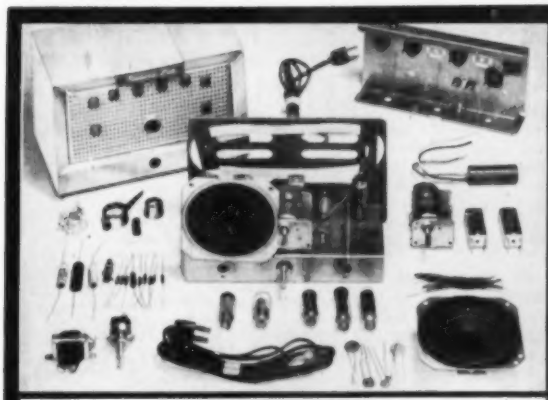

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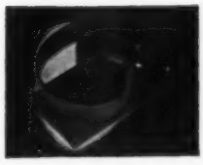

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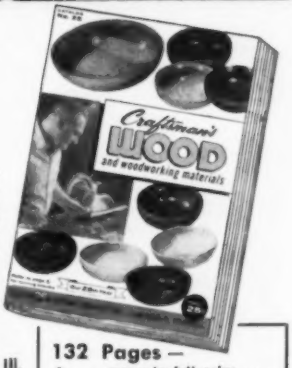

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SPECIFICATIONS

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Pen Makers to the Trade Since 1827

SHOP EQUIPMENT NEWS

(Continued from page 42A)

vises, consisting of 18 models. The vises feature a new 3-point mounting, reputed to reduce installation time 50 per cent. This employs 2 slotted brackets and a center rest, to assure firm, tight fastening, easy operation, and longer life. By using a template, furnished with each vise, the bench can be pre-drilled and bolts partially placed before vise is located.

When mounted, top of vise jaws is approximately ⅛ in. below bench top. Consequently, top edge of the bench will help to keep tools from striking metal jaws of vise. Bench top can be refinished without removing and remounting vises.

Other new features, listed by the manufacturer, are a complete streamlining of the front jaw and elimination of sharp edges. The vise is said to be injury-proof and tamperproof. Guide rods are hydraulically pressed into the one-piece jaw assembly.

Vises are available in 4 by 7-in., and 4 by 10-in. jaw sizes. Users have their choice of 2 types of continuous screw mechanisms — Rapid Acting or Solid Nut. Also, they may select either plain or dog type front jaws. Vises are furnished with either hardwood or tubular steel handles. Adjustable steel handles are standard on 2 models.

For details and specifications write for Bulletin LL-8216.

(For further details encircle index code 0703)

PRECISION BENCH SHAPER HAS PRESSURE LUBRICATION

South Bend Lathe Works are now manufacturing an improved 7-in. stroke precision Bench Shaper. For smooth operation at high speeds, this shaper has been equipped with an automatic pressure lubrication system. A cam operated piston pump circulates lubricating oil from a large reservoir to all important bearing surfaces. Oil pressure is adjustable and can be maintained at all speeds. This cushions the shock of reciprocating ram action and results in exceptionally smooth and quiet operation even at maximum speeds.

Length of ram stroke is adjustable, 0 to 7 in. Rocker arm shoe is graduated to indicate length of stroke. Stroke rates range from 42 to 195 per minute and cutting speeds from 3 to 114 ft. per minute. Tool head has 3-in. feed and swivels to any angle. Worktable is $6^{5}/_{16}$ in. long, 5 in. wide, and $5^{5}/_{8}$ in. deep. Power crossfeeds range from .002 in., with $9^{1}/_{2}$ in. maximum travel. Vertical travel of table is 5 in.

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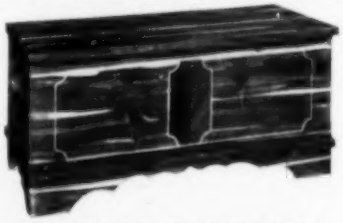

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Equipment Division

South Bend Precision Bench Shaper

Slots and holes are provided on top and both sides of table for clamping work fixtures or vise. One side of table also has a V groove. Vise has graduated swivel and swivels to any angle. Vise jaws are 4 in. wide, 1 in. deep, and maximum opening is 4 in.

Additional information is available.

(For further details encircle index code 0704)

WILLIAMS TUBE CUTTER AND FLARING TOOL SET

J. H. Williams & Co., manufacturer of industrial and automotive wrenches, tools and drop forgings, has recently added a Tube Cutter and Flaring Tool set to their line.

This set includes one each No. 161 Tube Cutter, No. 161-A extra Cutter Wheel, and

Tube Cutter and Flaring Tool Set

No. 162 Flaring Tool with Compressor Attachment. These tools, packaged in a strong, attractive steel case, are all that is necessary for quick, efficient cutting and flaring work on copper, brass, and aluminum tubing in diameters of $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, and $\frac{5}{8}$-in. diameters.

The chrome-plated No. 161 Tube Cutter will cut tubing from $\frac{1}{8}$ to 1-in. diameter. The heat-treated tool steel cutter has a razor edge to insure a clean cut. A permanently attached reamer turns to a 90-deg. angle for the reaming operation and is designed to set flush against the tool when not in use.

The No. 162 Flaring Tool consists of a drop-forged compressor that easily slides over the die block. A hardened floating cone gives

(Continued on next page)

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• DEPENDABLE
• EFFICIENT
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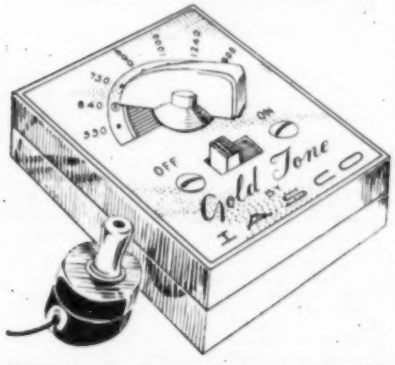

Kit Contains 2 transistors, Variable condensor, Coil, Diode, Resistor, Plastic Case, Dial, Tuning Knob, Switch, 2 lug strips, alligator clip, Wire, Solder, 2 batteries, Complete Instructions and GOLDEN TONE EARPHONE.

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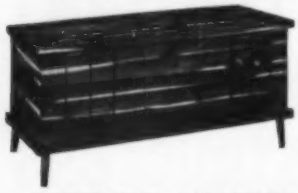

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SHOP EQUIPMENT NEWS

(Continued from previous page)

an even, accurate flare and taper that will insure a tight joint. Finish is cadmium plate.

Tools included in Set No. 165 may also be purchased individually.

(For further details encircle index code 0705)

NEW VENUS PENCIL SHOW CASE

Venus Pen & Pencil Corporation have introduced a new selling aid which offers pencils by the pack. It is an entirely new point-of-purchase display — the new Venus "Pencil Show Case" No. 1654-D.

Stocked with a complete range of pre-priced famous Venus pencil packages, all world famous Venus brand pencils are featured: Medalist, Indian, Velvet, Corral, Senator. All pencil packs are colorfully wrapped in printed cellophane to assure factory fresh delivery to customers.

A year-round pencil merchandiser, this new idea in counter merchandising helps build

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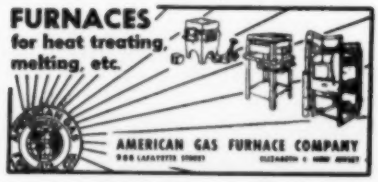

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4. Four-station drafting and planning table with storage for all drafting equipment.
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NOW AVAILABLE IN 3 SIZES
No. 425 Plurality Sub Jr.
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No. 450 Plurality Jr.

Grinding can be done on a cone, coarse or fine or emery leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

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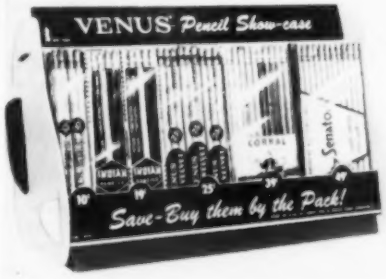

New Venus Pencil Show Case

larger unit sales for the retailer. It serves as a complete compact space-saving self service display unit, requires a minimum amount of space, and its colorful sparkle adds to every counter and encourages customer purchases.

(For further details encircle index code 0706)

HANDY CARRY-ME-HOME TOOL KITS

DeWalt Division of American Machine and Foundry Company, manufacturers of power tools for home and industry, has introduced a new idea in tool promotion packages.

Setting a new trend in combination display and carry-home cartons, the DeWalt tool kits are especially designed for self-service traffic. The dealer is offered a handsome display carton which converts easily into a handy carry-home package for the customer. The sturdy cartons also serve as ideal dust-free storage for accessories in the shop.

Accessory tools contained in the new cartons, are especially adapted for use on most homeshop radial-arm power tools, and will appeal to owners who want to give increased flexibility to their radial-arm equipment, thereby saving the space and cost of separate power tools.

The *Curve and Finishing Kit*, No. 8043, contains tools that quickly and easily convert the radial-arm power tool to a saber saw, disk sander and drum sander.

The *Boring, Routing and Finishing Kit*, No. 8044, contains accessories to convert the radial-arm power tool to a bore-drill unit, router, drum sander, and grinder.

These special kits are available immediately through all franchised AMF DeWalt Dealers. Further information is available.

(For further details encircle index code 0707)

NEW ROCKWELL-DELTA WOOD-METAL BAND SAW

Great rigidity and high torque transmission are provided in an improved model of the Delta 14-in. wood- and metal-cutting band saw just introduced by Rockwell Manufacturing Company.

The new model features a *beefed-up* drive which eliminates chatter and vibration under exceptionally difficult operating conditions at the extremes of the saw's unusually broad speed range — 40 to 3,000 f.p.m. with a standard low-cost 1,725 r.p.m. motor.

This first major design change in the band saw since its introduction two years ago, this heavier, stronger drive adds to the serviceability of the machine which is designed to cut anything from wood, plastics, fibrous materials and aluminum— for which a speed of 3000 f.p.m. is recommended — to armor plate, stainless steel and tool steel — which

(Continued on page 34A)

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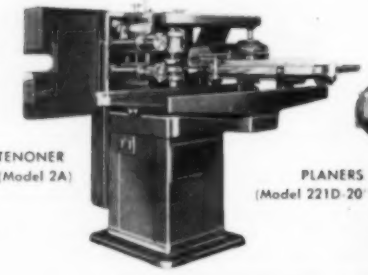

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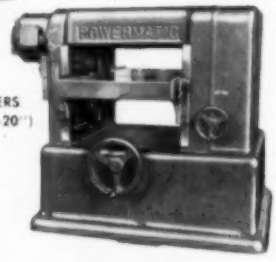
(Model 2A)



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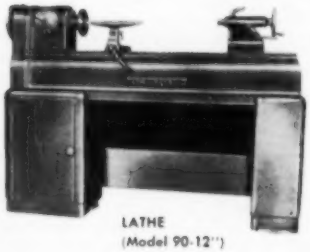
BAND SAW
(Model 80-20")



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READER'S SERVICE SECTION

INDEX TO SHOP EQUIPMENT

The index and digest of advertisements below are provided for your convenience in requesting free product information, catalogs and literature offered by the advertisers and the manufacturers listed in Shop Equipment News. To obtain this information or literature, encircle code numbers, sign the card, and mail. Your request will receive prompt attention.

Code No.		Page No.
90	**Adjustable Clamp Company** .. Jorgensen and pony clamps.	4A
91	**Allied Radio Corp., The** ..... Electronic supplies. Write for catalog.	39A
92	**Alondra Sales, Inc.** ..... Free wall chart on fuel pressure regulation. Use coupon, page 45A.	45A
93	**Alvin & Company** ..... Drafting materials and drawing instruments.	35A
94	**American Air Filter Co.** ..... Movie on dust control in shops.	11A
95	**American Gas Furnace Co.** .... Heat treating equipment.	46A
96	**American Technical Society** ... Textbook publishers. Free catalog.	20A
97	**Arisco Associates** ..... Drawing stand. Use coupon, page 35A.	35A
98	**Armstrong Bros. Tool Co.** ..... Standard tools. Tool holders. Write for catalog.	12A
99	**Atlas Press Company, The** .... Clausing 10" floor saw.	21A
910	**Bedford Lumber Co.** ..... Knockdown cedar chest and aromatic red cedar lumber.	46A
911	**Bennett Co., Inc., Chas. A.** .... Books for the school shop. Use coupon, page 28A.	28A
912	**Berger Scientific Supplies Corp.** All-in-one drafting kits.	31A
913	**Beseler Company, Chas.** ..... Overhead projector.	39A
914	**Better Light Better Sight Bureau** Teaching aids. Use coupon, page 41A.	41A
915	**Black and Decker Mfg. Co.** .... New H.D. belt sander. Use coupon, page 7A, for information.	7A
916	**Borden Co., The** ..... Glue.	20A
917	**Brodhead-Garrett Company** ... Lumber, machinery, benches, and hand tools.	19A
918	**Bruce Publishing Co., The** .. 3rd cover School shop texts.	
919	**Can-Pro Corporation** ..... Shop aprons.	4A
920	**Challenge Machinery Co.** ..... New booklet, "Planning your school shop." Use coupon, page 30A.	30A
921	**Chilton Company** ..... Arts and crafts books.	15A
922	**Cincinnati Milling Machine Co.** . Milling machines.	16A
923	**Cincinnati Tool Company, The** . Complete line of tools.	38A
924	**Columbian Vise & Mfg. Co.** ... Woodworkers vises.	10A
925	**Constantine & Son, Inc., Albert** Supply source for industrial arts departments.	47A
926	**Cope Plastics** ..... Plastics supplies.	43A
927	**Craftsman Wood Service Co.** .. New catalog of wood and woodworking equipment. Use coupon, page 43A, in ordering.	43A

Code No.		Page No.
928	**Delta Power Tool Div. Rockwell Mfg. Co.** ..... Power tools. Free catalog.	5A
929	**Designers Company** ..... Castings for school projects.	46A
930	**Diamond Tool & Horseshoe Co.** Tinners and metal cutting snips.	14A
931	**Dick Company, A. B.** ..... Offset duplicator. Use coupon, page 26A, for information.	26A
932	**Dietzgen Company, Eugene** 2nd cover Drafting, surveying, and printmaking supplies.	
933	**DonJer Products** ..... Project materials.	46A
934	**Driscoll & Co., Martin** ..... Printing inks.	46A
935	**Electric Hotpack Company, Inc.** High temperature kilns.	44A
936	**EICO** ..... Kits and instruments.	42A
937	**Electronic Kits Supply Co.** ..... Radio kit, illustrated catalog.	43A
938	**Foley Lumber Company, T. A.** ... Lumber. Free catalog.	39A
939	**Formit** ..... Tools and materials for making hand wrought iron work.	43A
940	**Gearon Company, Div. of Metomic Corp.** ..... Lamp parts catalog.	47A
941	**General Finishes Sales & Service Co.** ..... Wood finishing with Seotacell process.	40A
942	**General Scientific Co.** ..... New clear-view saw guard.	14A
943	**Gilbert & Miller, Inc.** ..... Desk and project accessories. New catalog.	44A
944	**Giles and Kendall Co.** ..... Knockdown cedar chest and aromatic red cedar lumber.	44A
945	**Greenlee Tool Co.** ..... Hand tools in perma pak.	10A
946	**Hammett Company, J. L.** ..... Handicraft supplies. Free catalog.	44A
947	**Hardwood Corp. of America** .. School shop lumber. Write for catalog.	33A
948	**Higgins Ink Co., Inc.** ..... New inks.	37A
949	**Hossfeld Manufacturing Co.** .... Universal iron bender. Free literature.	32A
950	**Immerman & Sons** ..... Do-it-yourself mosaics. Enamel-on-copper idea book.	44A
951	**Industrial Arts Supply** ..... Electricity kit. Project supplies. Write for catalog.	45A
952	**Johnson Gas Appliance Co.** ... Heat treating teaching aid.	33A
953	**Kasenit Co.** ..... Case hardening compound. Special offer.	44A
954	**Kassel & Co., L. H.** ..... Lamp parts and electrical supplies.	46A
955	**Kester Solder Company** ..... Flux core solder.	38A
956	**Larson Co., J. C.** ..... Free leathercraft and metalcraft catalogs.	47A

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These cards are provided for the convenience of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION readers in requesting information on products, services, booklets, and catalogs offered by the advertisers in this issue.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION
400 North Broadway, Milwaukee 1, Wisconsin

September, 1958

Please ask the manufacturers, whose code numbers I have encircled, to send me the information, catalogs, or product literature offered in this issue.

ADVERTISING INDEX

90	97	914	921	928	935	942	949	956	963	970	976	982	988	994	9100
91	98	915	922	929	936	943	950	957	964	971	977	983	989	995	9101
92	99	916	923	930	937	944	951	958	965	972	978	984	990	996	9102
93	910	917	924	931	938	945	952	959	966	973	979	985	991	997	9103
94	911	918	925	932	939	946	953	960	967	974	980	986	992	998	9104
95	912	919	926	933	940	947	954	961	968	975	981	987	993	999	9105
96	913	920	927	934	941	948	955	962	969						

ADVERTISING INDEX

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0702	0704	0706	0708	0710	0712	0714	0716	0718	0720	0722					

NAME (Please print) Position

SCHOOL

ADDRESS

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90	97	914	921	928	935	942	949	956	963	970	976	982	988	994	9100
91	98	915	922	929	936	943	950	957	964	971	977	983	989	995	9101
92	99	916	923	930	937	944	951	958	965	972	978	984	990	996	9102
93	910	917	924	931	938	945	952	959	966	973	979	985	991	997	9103
94	911	918	925	932	939	946	953	960	967	974	980	986	992	998	9104
95	912	919	926	933	940	947	954	961	968	975	981	987	993	999	9105
96	913	920	927	934	941	948	955	962	969						

NEW SUPPLIES AND EQUIPMENT

0701	0703	0705	0707	0709	0711	0713	0715	0717	0719	0721	0723	0724	0725	0726	0727
0702	0704	0706	0708	0710	0712	0714	0716	0718	0720	0722					

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READER'S SERVICE SECTION

(Continued)

Code No.		Page No.
957	**LeBlond Machine Tool Co., R. K.** ..... 4th cover Complete line of lathes.	
958	**Logan Engineering Company** .. Lathes. Write for catalog.	8A
959	**Mayline Co.** ..... Drawing equipment. Drafting table.	35A
960	**McKnight and McKnight** ..... Popular shop books. Use coupon, page 27A.	27A
961	**Millers Falls Company** ..... Tools. Write for information.	24A
962	**Mittermeier, Frank** ..... Imported carving tools and hobby-craft sets.	44A
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